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GLEN HAVEN AREA
SLEEPING BEAR DUNES

NATIONAL LAKESHORE / MICHIGAN





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DEVELOPMENT CONCEPT PLAN/INTERPRETIVE PROSPECTUS
ENVIRONMENTAL ASSESSMENT

Glen Haven Area
Sleeping Bear Dunes National Lakeshore
Michigan

Draft
April 1987

United States Department of the Interior
National Park Service

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INTRODUCTION

STUDY AREA

The Glen Lake area is a focus for visitor activity in Sleeping Bear Dunes National Lakeshore. Over 70 percent of park visitors come to this area. Attractions include the Sleeping Bear Dunes, a 5,000-acre complex of active dunes; Little Glen Lake, where a guarded swimming beach is available; the Dune Climb, the most visited area in the park; Stocking Scenic Drive, which offers panoramic views of Lake Michigan, the dunes, and the surrounding countryside; the former Coast Guard station, which now houses a maritime museum; and Glen Haven, a historic village (see Vicinity map). The Glen Haven study area is bounded by Glen Arbor on the east, the Sleeping Bear Dunes on the west, Lake Michigan on the north, and the Glen Lake moraine (Alligator Hill) on the south.

PREVIOUS PLANS AND STUDIES

The General Management Plan (GMP) for the lakeshore (NPS 1979a) includes the following proposals for the Glen Haven area:

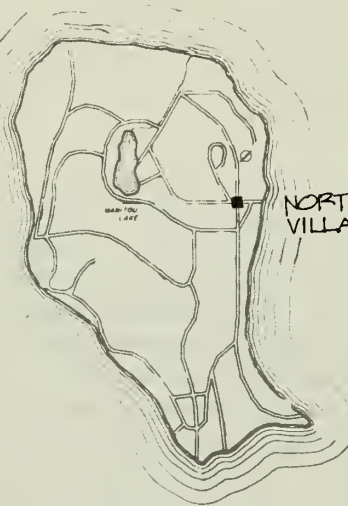
Glen Haven's village atmosphere, its historical significance in the development of the region, and its proximity to major access routes make it ideal for becoming a major tourist attraction. Interpretive themes will cover logging, agriculture, maritime history, and recreational activities. The buildings in the village and the lifesaving station will be adapted for interpretation, food service, craft sales, and management. The village atmosphere will be further enhanced by encouraging visitors to tour the site on foot and by not allowing private vehicles in the town during the summer. Road access will be provided to a parking area on the edge of the village. Public transportation between the parking area, the town, the lifesaving

station, and the northern tip of Sleeping Bear Dune may be available during the peak season for those who cannot walk or prefer not to. This would also help control use of the lifesaving station and the dune. At other times of the year, visitors will be able to drive their vehicles to the lifesaving station. Access will continue to be provided to private lands in the area.

The existing dune-ride will be eliminated because of visual and physical impacts on the dunes, conflicts with hikers, and the high cost of maintaining the road.

The D.H. Day Campground just east of Glen Haven will be rehabilitated. The capacity of the campground will remain the same, but there will be fewer campsites per acre, improving the visitor experience by increasing the vegetative cover between sites. Access to the beach in this immediate area will be limited to visitors staying at the campground. A group campground for approximately 80 people will also be developed in

NORTH MANITOU
ISLAND



NORTH MANITOU ISLAND
VILLAGE

SOUTH MANITOU
ISLAND



SOUTH MANITOU ISLAND
COAST GUARD STATION

LELAND

CAMP DYER
POINT

PYRAMID POINT

GOOD HARBOR
BAY

GLEN HAVEN

SLEEPING BEAR POINT
LIFESAVING STATION

SLEEPING BEAR POINT

D.H. DAY CAMPGROUND

DUNE CLIMB

STOCKING SCENIC DRIVE

EXISTING VISITOR CENTER

NORTH BAR LAKE

SOUTH BAR LAKE

EMPIRE

PARK HEADQUARTERS/
VISITOR CENTER

SLEEPING BEAR
BAY
GLEN HAVEN
GLEN ARBOR

GLEN LAKE

BARRETTVILLE

BARLE CITY

CE BAR



VICINITY

GLEN HAVEN AREA

SLEEPING BEAR DUNES NATIONAL LAKESHORE, MICHIGAN

U.S. DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

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the area to help accommodate the demand for group facilities. A new 50-site hike-in campground will be developed in the Burnham Woods area.

Sleeping Bear Dunes National Lakeshore does not have a parkwide interpretive prospectus (plan). As a supplement to the 1979 GMP, an "Interpretive Resource Base" was prepared (NPS 1979b). It provides detailed recommendations for interpreting the park's resources, including the Glen Haven area.

The GMP also proposed that a new docking facility for public boat service to the Manitou Islands and launching ramps for private boats be constructed somewhere between Port Oneida and Empire. The site was to be selected through a suitability/feasibility study. The study was begun in 1981, and Glen Haven was one of several sites evaluated (NPS 1984a). The study was completed in 1985, and based on extensive technical data and public input, the Park Service decided not to develop a mainland docking facility in the lakeshore.

In 1982 a special history study of Glen Haven Village was undertaken to provide information to assist area interpretation and to provide data to develop a National Register of Historic Places inventory/nomination form. The village was accepted to the National Register as a historic district on June 24, 1983. The history study entitled "D.H. Day's Kingdom" (NPS 1984b) was approved in February 1984.

PURPOSE OF THE DOCUMENT

This Development Concept Plan/Interpretive Prospectus/Environmental Assessment (DCP/IP/EA) presents the NPS proposal for use, development, and interpretation of the Glen Haven area for the next 10 to 15 years. The DCP/IP portion updates, amends, and expands on the general concept presented in the 1979 GMP. More specific proposals for facility construction and interpretive media, including priorities and current cost estimates, are presented. The EA portion of the document presents alternatives, impacts, and other considerations for environmental, endangered species, floodplains and wetlands, and cultural resource compliance requirements. An Assessment of Alternatives (NPS (1979c) was prepared for the GMP to analyze environmental impacts. The current EA therefore concentrates on issues not addressed in the GMP or any significant revisions being considered in the DCP.

PLANNING ISSUES

Cultural Resources

The 1979 GMP states that the village atmosphere will be preserved, and the buildings in the village and at the lifesaving (Coast Guard) station will be adapted for interpretation, food service, craft sales, and management. The GMP does not specify whether building exteriors and the historic landscape will be preserved as they are or restored to an earlier period. The Coast

Guard station has been adapted for maritime interpretation, and actions have been taken to adapt the fruit cannery building for a boat museum. Some buildings in the village, such as the Sleeping Bear Inn, have had limited exterior preservation treatments but are not currently used. Other buildings, such as the D.H. Day Store, are still in private hands under "use and occupancy" agreements with former owners. When these agreements expire, the buildings will be vacated, and maintenance will become the responsibility of the Park Service. Unused structures have deteriorated because they have not been properly maintained, and NPS costs for maintainance have increased. Costs will rise further as use and occupancy agreements expire. A specific strategy for the use (or nonuse) and treatment of the historic structures and landscape is needed to guide park maintenance, development, interpretation, and funding decisions.

Visitor Use and Interpretation

Although use has grown somewhat in recent years, Glen Haven Village has not yet become the major tourist attraction anticipated in the 1979 GMP. The area still has the potential to become an important regional attraction. As mentioned above, the Coast Guard station has been adapted for regional maritime history interpretation, and the cannery is being adapted for a boat museum to supplement the maritime interpretation theme. While future visitor use levels are difficult to predict, updated projections are needed to guide management and development decisions. Other interpretive themes identified for Glen Haven in the GMP--logging, agriculture, and recreation--are not sufficiently presented in the existing facilities at Glen Haven.

As proposed in the GMP, campsite density at the D.H. Day Campground has been reduced. However, this was accomplished by removing selected sites, lowering the total capacity from 124 to 88. The intent of the GMP was to retain the existing capacity by redesign and expansion. The campground regularly fills during the busy summer season, resulting in visitors being turned away. In 1980, a new campground design was prepared, but implementation was deferred pending the outcome of the docking facility study discussed above. The 1980 design needs reevaluation because the campground has a tradition of use that dates back to the early state park program in Michigan, a total redesign would be costly, and upgrading facilities might result in greater visitor use pressures that would contribute to capacity problems.

Other visitor facilities proposed in the GMP, such as trails and picnic areas, also need to be reevaluated and updated proposals incorporated into the DCP.

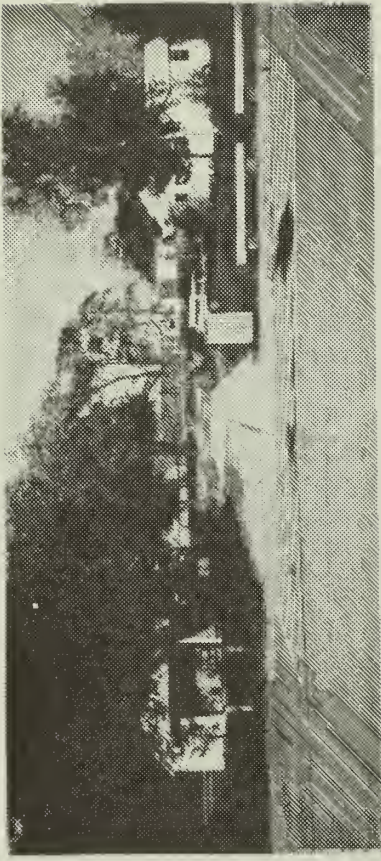
Access and Circulation

The GMP proposals for restricting private vehicles within Glen Haven Village and providing parking, a new road, and a public transportation system have not yet been implemented. These concepts are major elements that need reevaluation and updating to reflect new visitation projections, cost concerns, and current park management needs. Existing village parking is poorly defined and inadequate in size during heavy use periods. Visitors currently park along road shoulders and in private drives, or pull off on the grass. As guaranteed by land protection documents, access must be ensured for private lands and for reservations of use and occupancy during the term of the agreements.

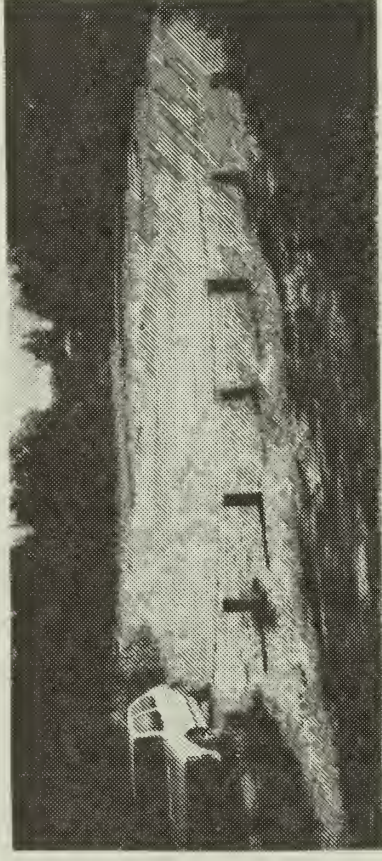
Since completion of the GMP, funding for public transportation systems in NPS units has been reduced. The GMP says a system may be provided and proposes a feasibility study to determine costs and other factors. Because the decision affects other issues, such as parking facility demands and locations, the feasibility study needs to be completed and a more definite direction set for the next 10 to 15 years.



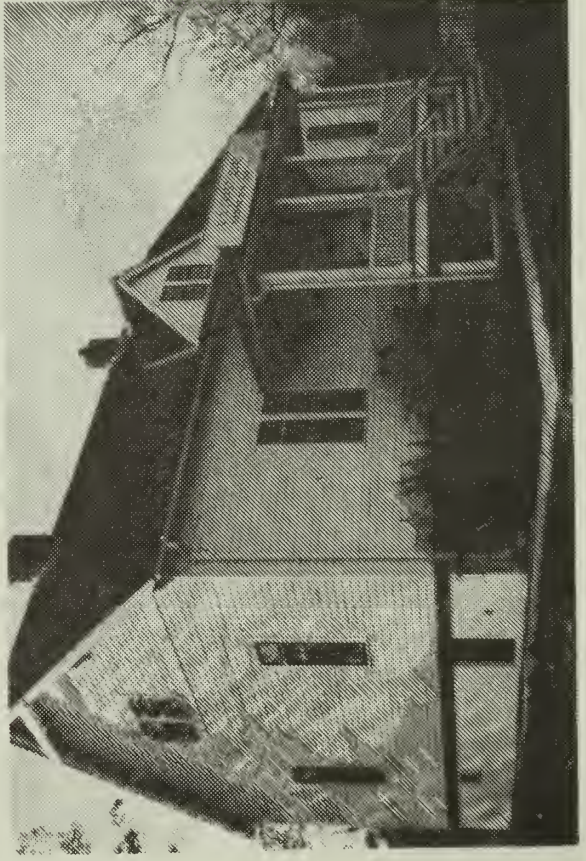
Lake Michigan shoreline at Glen Haven



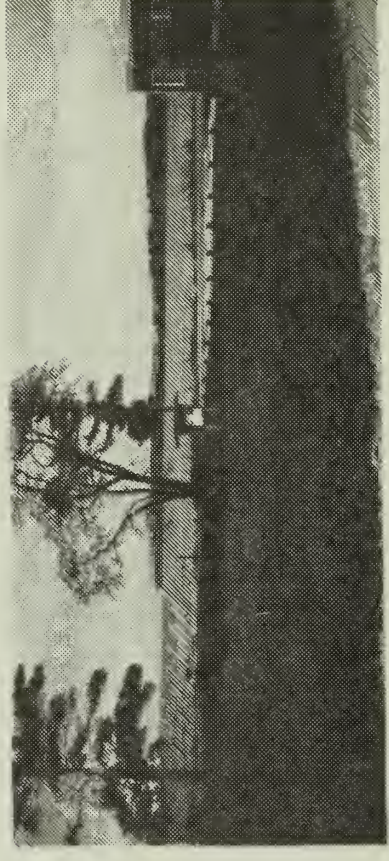
Coast Guard Station/Maritime Museum complex



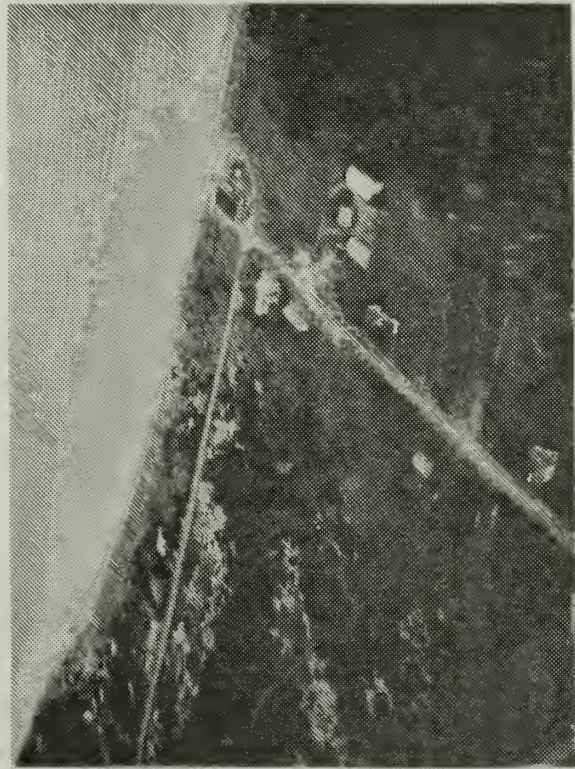
Sleeping Bear Point trailhead



Coast Guard Station main building



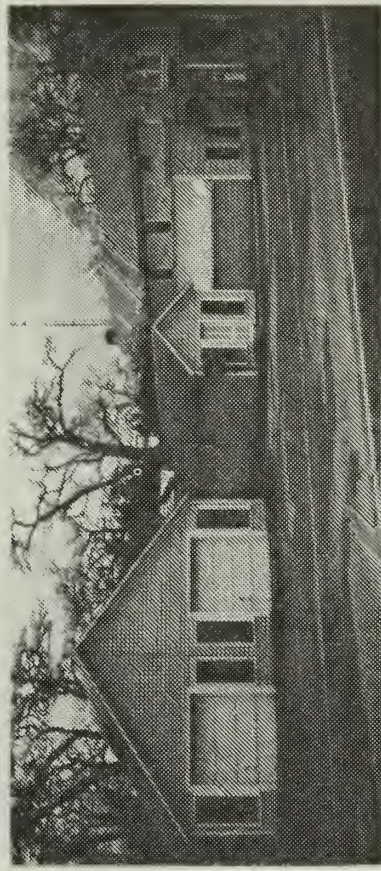
Existing picnic area near cannery



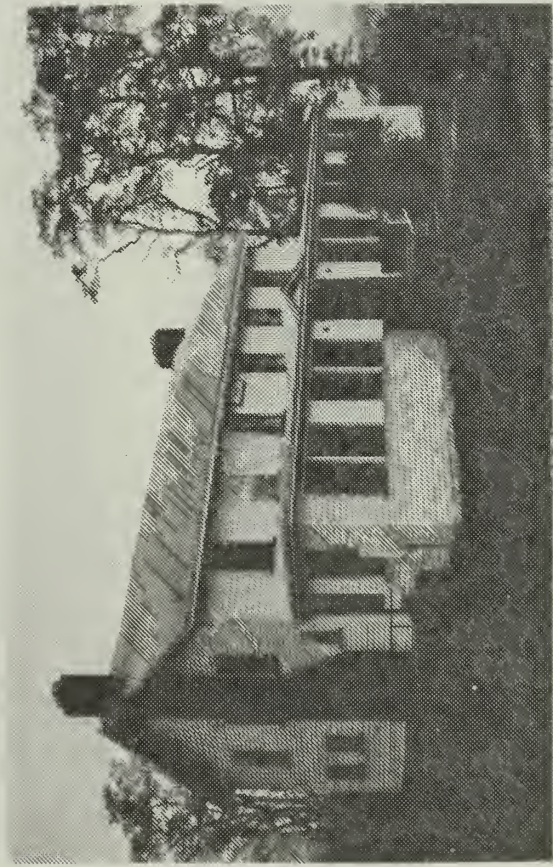
Glen Haven



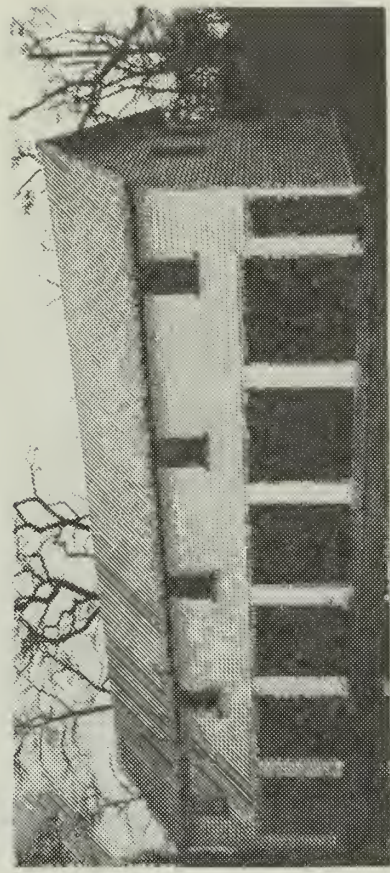
Glen Haven Village



Store, garage, storehouse, and store



Sleeping Bear Inn



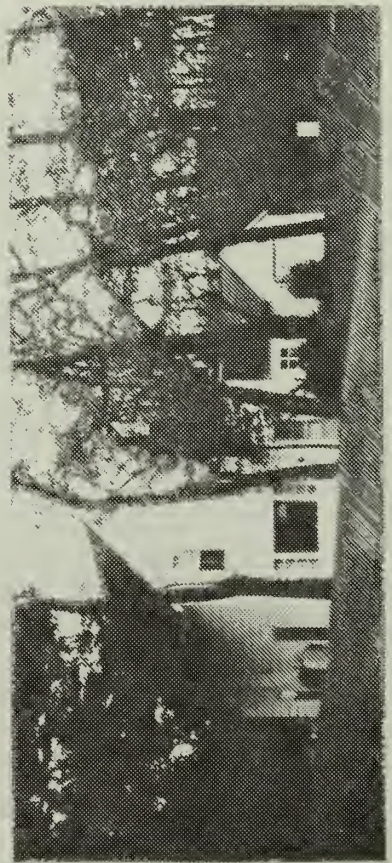
Sleeping Bear Inn garage



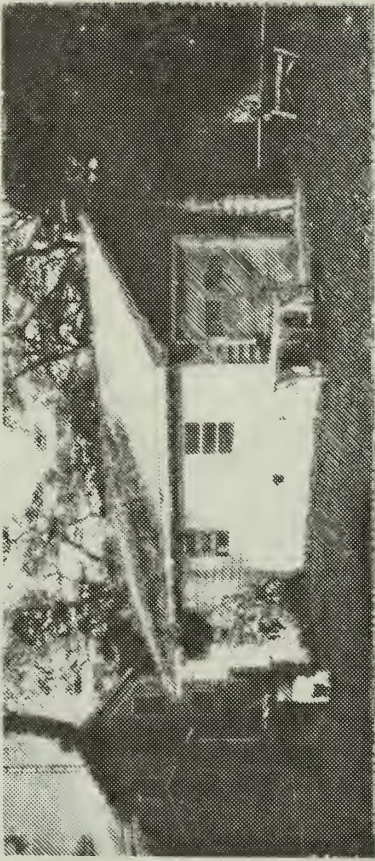
D.H. Day Store



Store outbuilding 2



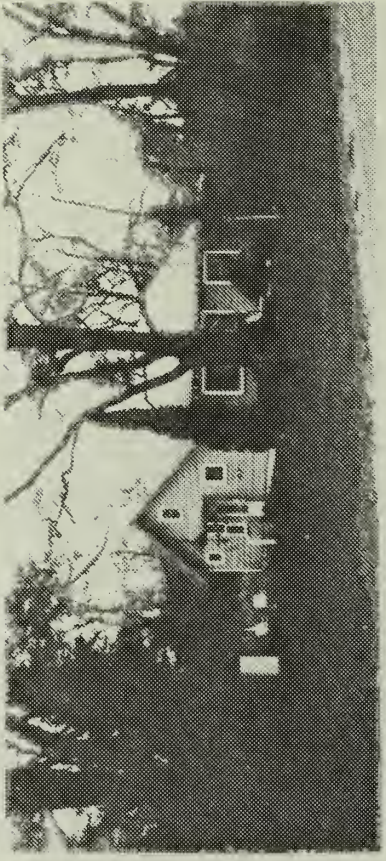
William Day house



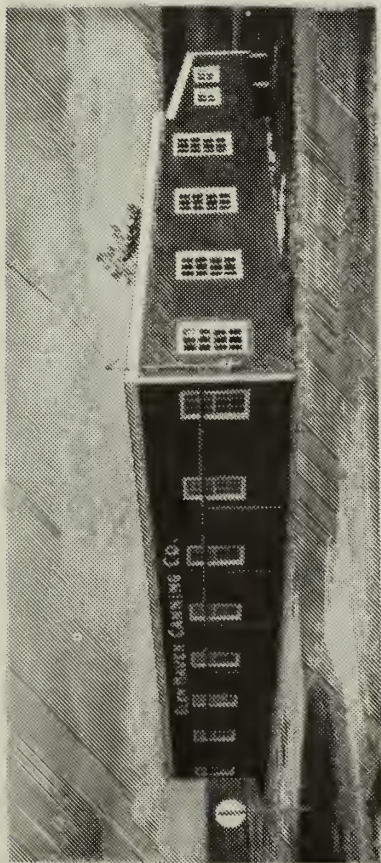
Store outbuilding 1



Pole barn



Dean house



Cannery



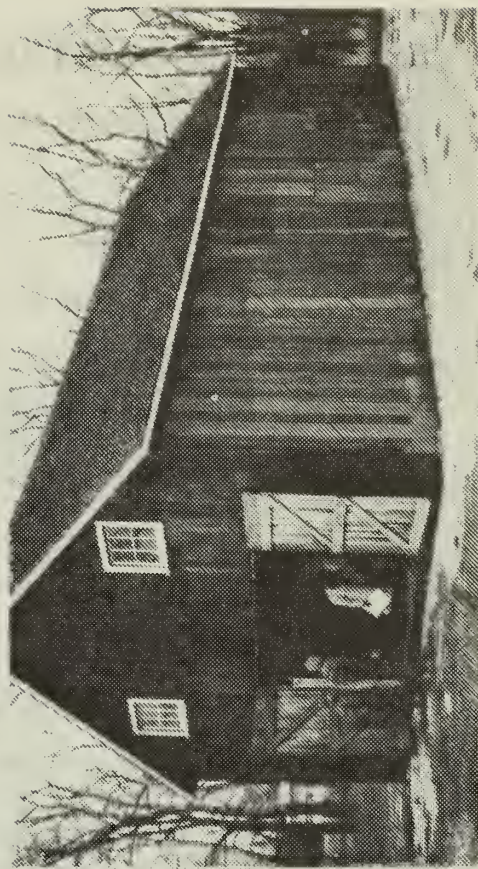
Fish tug next to cannery



Warner house



Bumgardner house



Blacksmith shop

Existing conditions/LAND STATUS

GLEN HAVEN AREA

SLEEPING BEAR DUNES NATIONAL LAKESHORE

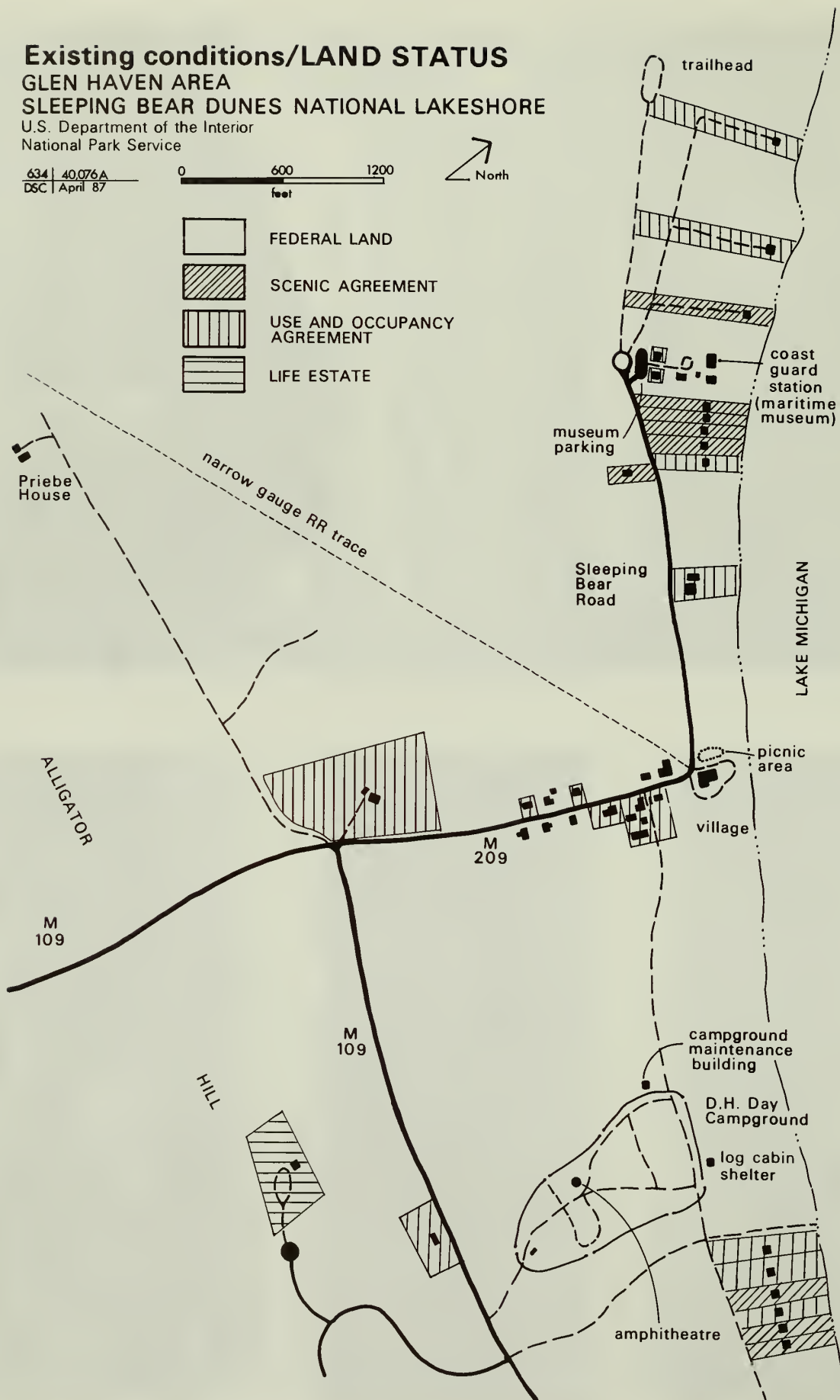
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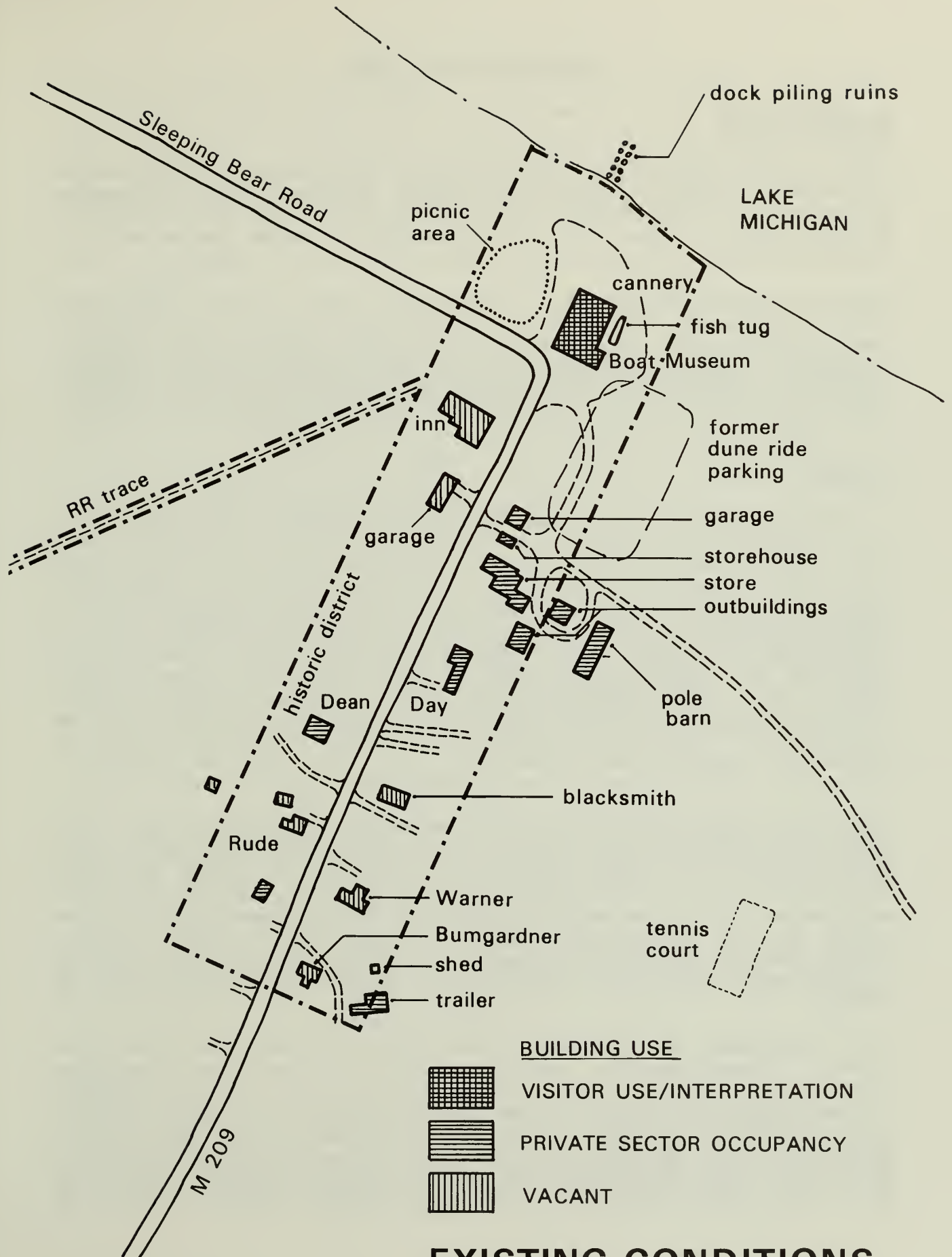
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feet



-  FEDERAL LAND
-  SCENIC AGREEMENT
-  USE AND OCCUPANCY AGREEMENT
-  LIFE ESTATE





EXISTING CONDITIONS **GLEN HAVEN VILLAGE** SLEEPING BEAR DUNES NATIONAL LAKESHORE U.S. Department of the Interior / National Park Service

0 100 200
feet



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DESCRIPTION OF THE AREA

REGIONAL SETTING

Sleeping Bear Dunes National Lakeshore is in the five-county Grand Traverse Bay region, an area of diverse recreational resources that is attracting growing numbers of vacationers and summer as well as year-round residents. Traverse City, 20 miles east of the lakeshore, provides the majority of transportation (air and bus) and visitor services for the region.

Access to the mainland portion of Sleeping Bear Dunes is by way of US 31 and M-22 from the south, M-72 and US 31 from the east, and M-22 from the north (see Vicinity map). M-22 traverses the entire length of the national lakeshore. North and South Manitou islands are seasonally accessible by boat from Leland, which is 5 miles north of the lakeshore boundary. Launching sites and docking facilities for private boats are in Frankfort and Leland.

HISTORY

The Sleeping Bear Point Coast Guard Station was originally constructed by the U.S. Lifesaving Service near the point in 1902. In 1931 the buildings were moved to their present location by the Coast Guard because of shifting sands. The station currently consists of a dwelling structure (HS-18), two boathouses (HS-19 and 20), a steel signal tower, and a washhouse building (HS-21). Boathouse 2 (HS-19) was converted to a garage in 1931 when the consolidation took place. The station was used until 1942. The station's crew never had to contend with a major maritime disaster or perform any major rescues. A few minor rescues and other general assistance were performed, but the crew spent most of its time doing routine housekeeping chores and preventive drills and maintenance work. In 1970 the station became part of the national lakeshore, and on April 26, 1979, it was placed on the National Register of Historic Places. It was judged to have statewide significance.

The history of Glen Haven Village was dominated by the personality of David Henry Day. Only a few of the extant structures were built before Day's arrival in 1878. The Sleeping Bear Inn (HS 25-106A), for example, is reputed to have been built as early as 1857. This building, as well as others, nevertheless took on the imprint of Day's forceful management after he came to the place as the operations manager for the Northern Transit Company. Within three years after his arrival he had bought out the company holdings at Glen Haven while still maintaining a working relationship with the company.

Day's achievements at Glen Haven include supplying cordwood for Great Lakes steamers, logging timber for lumber, providing a stopping place for transient travelers on the lakes and for incipient settlers on the Michigan mainland, and beginning an agricultural system that finally evolved into the successful cherry-growing/fruit-farming of northwest Michigan. From the national perspective, Day's endeavors best illustrate the major theme of "America at Work," for he was functioning as an industrialist who used the technologies for cutting timber either for cordwood or lumber; running a sawmill to

prepare the lumber for export; moving the finished lumber by rail and locomotive to his dock for transport to the major U.S. markets, principally Chicago; beginning an agricultural establishment that at first engaged in dairying and raising stock; and finally moving into fruit horticulture and resort development. The resort burgeoned further after Day's death in 1928, and together with a cherry cannery, thrived until after World War II. Sleeping Bear Inn continued to function as a resort until 1972.

NATURAL RESOURCES

Topography

Geologic processes sculpted the Upper Great Lakes region of Michigan, Wisconsin, and Minnesota. The most evident examples are glacial remnants of the last great ice ages--moraines, lakes, and drainage channels. Although the post-glacial lake formations are not highly visible, they illustrate an important part of the geological story. The processes that are changing the landscape today include the gradual filling of bays, the erosion and accretion of beaches, the wearing away of headlands, and the formation of sand dunes, such as Sleeping Bear Dune itself.

Sand Dunes

Sand dune preservation was one of the primary reasons that the Sleeping Bear area was designated a national lakeshore. The Sleeping Bear Dunes, just west of Glen Haven, is the largest dune complex in the lakeshore. The state of Michigan passed the Sand Dunes Protection and Management Act to protect dunes along the state's shorelines. Much of the active dunes area in the national lakeshore has been classified as a designated sand dune area under the act.

Soils

Except for some areas of muck, the soils in the park are generally sandy, well-drained, and very susceptible to erosion, especially in areas where vegetation has been removed by strong off-lake winds. Steep slopes also increase the vulnerability of soils to erosion.

At Glen Haven most soil material is well drained, nearly level to gently sloping, and sandy in texture. Small areas of muck soils occur in low areas. None of the soil types at Glen Haven have been designated prime or unique farmland by the Soil Conservation Service.

Vegetation

The most common natural vegetation types in the lakeshore are beech-maple and aspen-pine-oak forests. Beach and active dune, heath, and wetlands vegetation types are most sensitive to human use. At Glen Haven, beach and active dune, heath, transition zone, and pine-oak-aspen forest types are present. In general, vegetation sensitivity to human use decreases with

distance from the lake. All associations are sensitive to wind erosion if vegetation is destroyed. The forest vegetation type is the least sensitive because the trees act as windbreaks, and the denser vegetation provides more stability.

Extensive populations of Pitcher's thistle, or the dune thistle (Cirsium pitcheri), a species listed as threatened by the state of Michigan and under review for listing by the U.S. Fish and Wildlife Service, are found along the shoreline near Glen Haven.

Floodplains and Wetlands

No streams or rivers are in the Glen Haven area. According to a report prepared by the U.S. Army Corps of Engineers (COE 1977) and the Flood Insurance Administration's flood hazard boundary maps (FIA 1977), the 100-year Lake Michigan elevation is 582.4 feet (International Great Lakes Datum), the 500-year elevation is 583 feet, and none of the existing structures at Glen Haven are in these floodplains. Wave runup should add less than 2 feet to these levels (COE, personal communication 1986). New record-high levels were set for Lake Michigan in 1986. The previous all-time record high of 581.0 feet set in July 1974 was exceeded in October 1986 (COE 1986). The new record is 581.63 feet average for the month. These record-high levels have resulted in beach erosion near the cannery and groundwater infiltration into the basement of the Coast Guard station.

The National Wetlands Inventory (1980) includes two small wetland areas in the pine-oak-aspen forest and transition zone between the Sleeping Bear Dunes and M-209.

Wildlife

The largest mammal in the vicinity of the national lakeshore is the white-tailed deer. Smaller species that are common include raccoon, porcupine, snowshoe hare, cottontail rabbit, red fox, woodchuck, striped skunk, mink, and a variety of squirrels.

Bird life is abundant and varied. Common species found in the morainal plateau areas and active dunes are vesper sparrow, horned lark, goldfinch, and marsh hawk. In hardwood forests the red-eyed vireo, redstart, and ovenbird are common. Shorebirds, grebes, herons, ducks, rails, and loons are found in shore areas, marshes, and swamps.

The bald eagle (Haliaeetus leucocephalus), a federal threatened species, and the peregrine falcon (Falco peregrinus anatum), a federal endangered species, are occasionally reported in the Sleeping Bear area; but no nesting occurs there. Bird species experiencing regional population declines or range diminution include four hawks (sharp-shinned, Coopers, red-shouldered, and marsh), the osprey, American kestrel, piping plover, and yellow and common yellow-throated warblers. The piping plover (Charadrius melodus) is listed as an endangered species by the U.S. Fish and Wildlife Service. The beaches near Glen Haven are potential habitat for the plover, although nesting has not been observed for several years.

Fish

Seventy-six fish species have been reported in the lakeshore vicinity. Of these, about 34 species are found in Lake Michigan, and the remainder inhabit inland lakes and streams. The most important sportfish are coho and chinook salmon, rainbow and brown trout, and rainbow smelt. In Sleeping Bear Bay, which includes the Glen Haven area, large schools of juvenile alewife, spottail shiner, longnose dace, and several young lake herring (a Michigan threatened species) have been observed.

Climate

Climatic conditions along the Lake Michigan shoreline have a pronounced influence on resources management and on visitor use. Blowing sand in nonvegetated areas, cold winter winds, moisture, and fog all have a strong influence on plants and animals, the visitor experience, and the types of facilities that can be provided.

Extreme seasonal temperature variations and a fairly even annual distribution of precipitation are typical of the Upper Great Lakes region. However, climatic conditions in the vicinity of Sleeping Bear Dunes National Lakeshore are strongly influenced by Lake Michigan, which has a stabilizing effect on air temperatures. Because of the prevailing westerly winds, winters are milder and summers are cooler along the shoreline than in the interior. This moderating effect on shoreline air temperatures results in a growing period of 150 days for agricultural crops, compared to a period of only 100 days a few miles inland.

Air and Water Quality

Sleeping Bear Dunes National Lakeshore is a class II air quality area. This means that it is in a clean air region where air quality is better than the applicable national air quality standards, and good air quality maintenance is an intermediate priority. Deterioration to specified increments over baseline concentrations is permitted. There is an EPA/state-sponsored air quality monitoring station at the lakeshore's visitor center about 4 miles south of Glen Haven. The results of this monitoring suggest that pollution levels are generally low at the park. Occasionally, high acid rain levels are recorded.

Lake Michigan waters in the vicinity of the lakeshore are considered to be of high quality (personal communication, David Kenaga, Michigan Department of Natural Resources, December 12, 1981).

Visual Quality

The Glen Lake area has more geologic features than any area on the lakeshore, ranging from wave-cut bluffs and a classic perched dune to a glacial drainage channel outwash fan and symmetrical kettle. The vegetation includes the largest old field juniper in the national lakeshore and a relic (or ghost)

cedar forest. From higher portions of the area one can see Glen Lake, the Manitou Islands, South Fox Island, Sleeping Bear Dunes, Sleeping Bear Bay, and Lake Michigan.

CULTURAL RESOURCES

Archeology

Several archeological reconnaissance surveys were made in the Glen Haven area in 1981 and 1982 by the Midwest Archeological Center--in the area west of the village, in the area between the village and the D.H. Day Campground, and at the Coast Guard station. West of the village, the survey identified several historic dumpsites, recent cultural debris such as broken china and pottery, a historic railroad grade (ca. 1907), the historic Pine Street alignment, and the routes of the old telephone lines to the Coast Guard station and the Manitou Islands. In addition, archeological remains of the dock, a roundhouse, barn, and other outbuildings are likely. In the area between the village and the campground, the survey found several small dumps, scattered historic artifacts, the remains of a historic ice-skating rink/curling court, tennis courts, and the historic alignment of Pine Street. Remains of a former slaughterhouse, outbuildings, and an early 20th century native American community are believed to be in the area. In 36 shovel tests at the Coast Guard station, nothing of consequence was uncovered, probably because of the extensive landscaping efforts undertaken by Coast Guard personnel during the active life of the station.

Because of extremely poor ground surface visibility within much of the area surveyed, the team recommended that intensive, systematic shovel-testing be conducted before construction at any site, and that monitoring be done during construction by a knowledgeable member of the park staff.

Historic Resources

The Sleeping Bear Inn was listed on the National Register of Historic Places on September 6, 1979. The Glen Haven Village Historic District (including the inn) was listed on the National Register on June 24, 1983. The inn and the village district were rated as having local significance. The inn is significant because it was the first structure in Glen Haven and is a fine example of a frontier hotel. Glen Haven Village is significant because it is an excellent example of a turn-of-the-century company lumber town, one which was vital to the growth and economic well-being of the Leelanau County area.

The Sleeping Bear Point Lifesaving (Glen Haven Coast Guard) Station was also listed on the National Register in 1979, with a state level of significance because of its architecture, site integrity, and relationship to a national system of aids to navigation.

The log cabin/shelter in the D.H. Day Campground may be eligible for listing on the National Register of Historic Places, but it has not yet been evaluated for significance.

For a complete list of the National Register historic structures in the study area, see table 1.

VISITOR USE

Recreation visits to Sleeping Bear Dunes National Lakeshore have varied over the last 10 years, with no consistent trend of increase or decrease. This relative stability may be because 70 percent of Sleeping Bear visitors are Michigan residents. Visitation to Sleeping Bear Dunes is also highly seasonal; peak use occurs in July and August.

There are no annual visitor statistics for the entire Glen Haven area. The maritime museum in the Coast Guard station was opened to visitor use in 1984 with about 30,000 visits recorded in 1985 and approximately 59,700 in 1986.

Table 2 shows numbers of vehicles and visitors counted by the NPS Statistical Unit at the maritime museum, the dunes trailhead, and the old cannery during July and August 1985.

Table 1: Glen Haven Historic Structures

<u>Name</u>	<u>Number</u>	<u>Date Constructed</u>	<u>Type</u>	<u>Approx. Size (Square Feet)</u>	<u>Condition</u>	<u>Current Status</u>
Sleeping Bear Inn	HS 25-106A	1857	Two-story frame with clapboard siding & gable roof	6,000	Fair	Federal/Vacant
Sleeping Bear Inn garage	HS 25-106B	1928	Two-story frame with clapboard siding & gable roof	2,400	Good	Federal/Vacant
D. H. Day Store	HS 25-121A	1865	Two-story frame with clapboard siding & gable roof	2,000	Good	Private use and occupancy until 1993
D. H. Day Store- storehouse	HS 25-121B	c.1910	One-story frame with clapboard siding	340	Good	Federal/Vacant

<u>Name</u>	<u>Number</u>	<u>Date Constructed</u>	<u>Type</u>	<u>Approx. Size (Square Feet)</u>	<u>Condition</u>	<u>Current Status</u>
D. H. Day Store/garage	HS 25-121C	c.1915	One-story frame with clapboard siding	820	Fair	Federal/Vacant
Glen Haven Signal Tower	HS 25-121E	Unknown	Diagonally-braced fabricated metal pyramidal	NA	Good	Federal
Blacksmith shop	HS 25-121D	c.1860	Two-story frame barn with vertical siding & gable roof	900	Good	Federal/Vacant
D.H. Day sawmill site	No longer extant	1868	Unknown	Unknown	Gone	NA
D.H. Day narrow gauge railroad	Mostly obliterated	c.1880	Earthwork roadbed 10 feet wide	NA	Deteriorated	NA
William Day house	HS 25-118	c.1890	Two-story frame	2,300	Good	Private use and occupancy until 12-1-92

<u>Name</u>	<u>Number</u>	<u>Date Constructed</u>	<u>Type</u>	<u>Approx. Size (Square Feet)</u>	<u>Condition</u>	<u>Current Status</u>
Bumgardner house	HS 25-122	c.1890	1-1/2-story frame with clapboard siding T-shaped	1,350	Fair	Federal/vacant
Warner house	HS 25-114	c.1898	1-1/2-story frame with clapboard siding	1,100	Fair	Federal/vacant
Rude houses	HS 25-107	c.1917	One-story frame with clapboard siding and gable roof	600	Poor	Federal/vacant
Rude garage	HS 25-107A	c.1917	One-story frame with clapboard siding	400	Poor	Federal/vacant
Fruit canning factory	HS 25-153A	c. 1925	One-story frame with metal shed roof	3,000	Fair	Federal boat museum

<u>Name</u>	<u>Number</u>	<u>Date Constructed</u>	<u>Type</u>	<u>Approx. Size (Square Feet)</u>	<u>Condition</u>	<u>Current Status</u>
Wickland house	HS 25-108	c.1928 to 1947	One-story frame	500	Good	Private use and occupancy until 1998
Dean house	HS 25-115	c.1928	One-story frame	1,250	Good	Private use and occupancy until 11/19/90
Coast Guard lifesaving station	HS-18	c.1902	1-1/2-story frame	4,000	Good	Federal/Maritime Museum
Lifesaving station/boat-house/garage	HS-19	c.1902	One-story frame	1,000	Good	Federal
Lifesaving station boat-house	HS-20	c.1902	One-story frame with board & batten siding	1,300	Good	Federal/Maritime Museum
Lifesaving station/wash house building	HS-21	c.1902	One-story frame with horizontal wood siding	200	Good	Federal

<u>Name</u>	<u>Number</u>	<u>Date Constructed</u>	<u>Type</u>	<u>Approx. Size (Square Feet)</u>	<u>Condition</u>	<u>Current Status</u>
Lifesaving Station/self- bailing lifesaving boat	HS-22	c.1902	NA	NA	Poor to fair	Federal
Lifesaving station/signal tower	NA	1914	Steel	NA	Good	Federal

Table 2: Numbers of Vehicles and Visitors Counted
at Three Glen Haven Parking Areas, Sleeping Bear Dunes, July-August 1985

		<u>Vehicles</u>	<u>Visitors</u>
Maritime museum	July	3,660	21,220
Parking area	August	6,160	20,330
Dunes trailhead	July	860	2,860
Parking area	August	1,400	4,660
Cannery	July	3,440	11,200
Parking area	August	1,850	6,350

Based on the NPS Statistical Unit's figures, average daily visitation to the Glen Haven area during July and August was estimated to be about 1,000 people. Comparing the visitor counts at each of the three sites to the total count, it appears that approximately 63 percent of the visitors go to the maritime museum, approximately 11 percent use the trailhead, and about 26 percent stop at the cannery/village area. Translating the percentages into peak use daily averages, the maritime museum receives about 630 people, the trailhead about 110 people, and the cannery/village area about 260 people. As facilities, programs, and activities are developed at Glen Haven Village, the percentage of visitation to the village can be expected to increase significantly.

Assuming that about the same numbers of people will visit the village as visit the maritime museum and assuming a 2 percent per year increase in visitation at the Glen Haven area, visitation to the area may reach 1,800 people per day by the year 2005. Because these estimates are not based on substantiated data, it will be important to evaluate them as visitation patterns are established in the area.

EXISTING DEVELOPMENT

Access to Glen Haven is provided by M-209, a paved two-lane road. From the cannery west to the Coast Guard station, the road is designated as Sleeping Bear Road, a county road.

Little designated parking is available at Glen Haven Village. Around the cannery is an unpaved parking area for a few vehicles. Visitors also park alongside the road. Because signs, parking, and pedestrian access are inadequate, the first-time visitor experiences a certain amount of confusion on arriving at the village. Development at the maritime museum in the Coast Guard station, on the other hand, is well organized and provides signs, parking (20 car/2 bus), pedestrian access, and visitor restroom facilities. A nearby one-lane, two-way road leads to a trailhead that provides access to the dunes near Sleeping Bear Point (see Existing Conditions map).

The cannery, inn, blacksmith shop, and Warner house in the village are open to visitor use when guided tours are given. The cannery is being adapted for a boat museum. There are two vault toilets nearby. The beach is open to the public, and about six picnic tables are in a grassy area adjacent to the cannery.

The D.H. Day Campground has 88 sites, an amphitheater, water system, vault toilets, and gravel roads. The campground fills nightly during the park's high-use season in July and August. Many visitors return year after year and consider the campground a traditional part of their vacation experience.

Based on the visitation counts for the Coast Guard station, Dunes trailhead, and cannery, and using an average of 3.3 people per car, these figures translate to 190, 33, and 78 cars at the three sites. Adjusting for average lengths of stay (one hour each at the Coast Guard station and cannery and four hours at the trailhead), an estimated 25 parking spaces are currently needed at the Coast Guard station, approximately 20 spaces are needed at the trailhead, and about 20 spaces are needed at the cannery/village area. Based on visitor projection estimates (see "Existing Visitor Use" section and appendix A), parking needs may increase to 35 spaces at the Coast Guard station, 30 spaces at the trailhead, and 45 spaces at the village by the year 2005.

THE PROPOSAL

This section presents the proposed interpretation and development plan for the Glen Haven area. As indicated in the "Introduction" section, the overall concept is described in the 1979 GMP. Additional detail and variations on the GMP concept are described in this section. The current proposal represents the minimum requirements to manage the area effectively, except for the campground concept (which is the same as that approved in the GMP). Alternative 2 describes the minimum requirements for the campground.

PLANNING OBJECTIVES

Preserve the cultural landscape and interpret the history of the Glen Haven area

Protect natural resources in the area, including the sand dunes, endangered species habitat, wetlands, and other critical resource elements

Reduce or remove vehicular traffic from the village to preserve the historic scene, increase pedestrian safety, and enhance the visitor experience

Provide opportunities for recreational activities consistent with natural and cultural resource protection needs

Stimulate interest in regional maritime and other appropriate history themes for the area

Demonstrate the interrelationship between the natural resources and cultural history of the region

INTERPRETATION

The interpretive significance of Glen Haven Village is that it represents the typical, small company-owned or dominated town that developed around the turn of the 20th century along the shores of the Great Lakes, especially northeastern Lake Michigan. Typical of the entrepreneurial businessmen who owned and dominated the commercial and social life of these lakeshore communities was D.H. Day, the key figure in Glen Haven's history.

Over time, the companies engaged in a number of commercial enterprises such as lumbering, fishing, fruit growing and processing, and tourism--using a broad range of regional resources to maintain an economic livelihood. To support these enterprises, the towns typically included a company store, company boardinghouse and hotel, company-owned homes, privately owned homes, warehouses, a blacksmith shop, tramway for lumber products, sawmill, dock, and a company farm. Of these customary structures, all but the sawmill, dock, and warehouses still remain in the Glen Lake area. The sawmill is gone, but the millpond remains, the old dock pilings are at times still visible, and a trace of the narrow gauge railroad can be found. The Glen Haven cannery is typical of many fruit processing plants that were developed in communities following the lumber era.

The village buildings and landscape will be preserved and maintained, which largely reflects the 1920s scene. The area will not be restored or reconstructed because restoration is not essential to visitor understanding of the area, adequate data may not be available to duplicate restored features accurately, restoration and reconstruction would be extremely expensive, funding for such actions is becoming extremely limited, and NPS policy favors preservation over restoration or reconstruction. The Glen Haven story is one of establishment, growth, transition, and decline. To stress a particular earlier time period would be inappropriate because the significance of the area lies in the story. The stages of development will be treated through publications, historic photographs, exhibits, and on-site personal services.

Primary elements of the interpretive program at Glen Haven will include the following:

- Orientation to the Glen Haven area--its significance and how to best see the area

- Story of the industries--shipping, fishing, logging, agriculture, tourism--as broad-based uses of resources to maintain economic stability

- Story of life in the company town

- Story of D.H. Day and his empire

Glen Haven has been designated as having local, rather than state or national, significance on the National Register of Historic Places. Timber history, agriculture, tourism, and the area's connection to maritime commerce and Great Lakes fishing are all part of Glen Haven's story. Although Glen Haven is not a major historic town, it is a pleasant place to visit and one of a group of complimentary experiences in the general vicinity: the dune climb, Sleeping Bear Point hiking trails, beach use, camping, and the maritime museum.

The various extant structures at Glen Haven and a self-guiding folder and wayside exhibits will be used to interpret the primary story elements and to provide information/orientation about how to visit the Glen Haven area. Interpretive media will be provided that do not require staffing, at least in the near future, but that are adaptable to occasionally staffing if necessary or desirable later. A separate visitor contact/interpretive station is not recommended for the village. In the following proposal and alternatives for development, the emphasis and locations for interpretation change, but the basic elements are similar.

VISITOR USE AND DEVELOPMENT

The general concept for development is to provide cost-effective facilities and media to achieve interpretive objectives, provide the desired visitor experience, encourage adaptive uses, and accommodate the anticipated

increased visitation while preserving the area's historic integrity and appearance. Historic structures will be adaptively used in a variety of ways, including interpretive, private, and administrative uses.

Village Access, Circulation, and Parking

The general concept for village access, circulation, and parking is to allow visitors to drive on a new access road developed around the historic district to a central 45-car parking area approximately 300 feet west of the village (see Proposed Development map). Handicap parking spaces and a hard-surfaced trail will ensure that all visitors have access to the village. A general orientation wayside exhibit with self-guiding folders will be provided at the parking area. Visitors will be directed to an interpretive wayside near the fruit cannery building that will provide information about the lake/village interface at a site near the former dock (the traditional entrance to the village) where the entire village can be seen. The existing stretch of M-209 in the village will be made a secondary one-way road for slow-speed local traffic, visitor drop-off, and pedestrian circulation. As shown on the Proposed Development maps, traffic will flow in the direction of Lake Michigan. This proposal will require the concurrence of the Michigan Department of Transportation. The stretch of Sleeping Bear Road from the cannery west approximately 800 feet would also be made one-way, with the concurrence of the Leelanau County Road Commission. The new road alignment around Glen Haven will enhance the historic scene and reduce vehicle/pedestrian conflicts in the village, while ensuring access to private lands in the area. Careful road and parking area design will minimize adverse impacts to the historic scene near the village.

The 1979 GMP recommended redesigning the M-109/209 intersection. This DCP/IP/EA includes a development concept for consideration by the state (see Proposed Development map). The proposal is to make the primary route (M-109) a continuous through road, with M-209 as the secondary road.

A shuttle system is not proposed in this DCP for the Glen Haven area because it is now anticipated that visitation will be inadequate to support a shuttle operation (see appendix A). Under the current proposal, parking areas will be available at the village, near the beach, at the Coast Guard station, and at the trailhead with capacities sufficient to accommodate expected use for the next 10 to 15 years. This strategy forestalls development of a large (200+ car) parking area, but will not close options for a shuttle system in the future if use levels exceed projections. The Park Service will, however, encourage expansion of the county public transportation system to serve the Glen Haven and other nearby activity areas in Sleeping Bear Dunes National Lakeshore.

Interpretive Facilities

The fruit cannery building will continue to be used as a boat museum because it offers a large open space to display boats and because Glen Haven has historic ties to Great Lakes maritime industries. A series of exhibit panels will be created to augment and interpret the boats. A few maritime artifacts

PROPOSED DEVELOPMENT

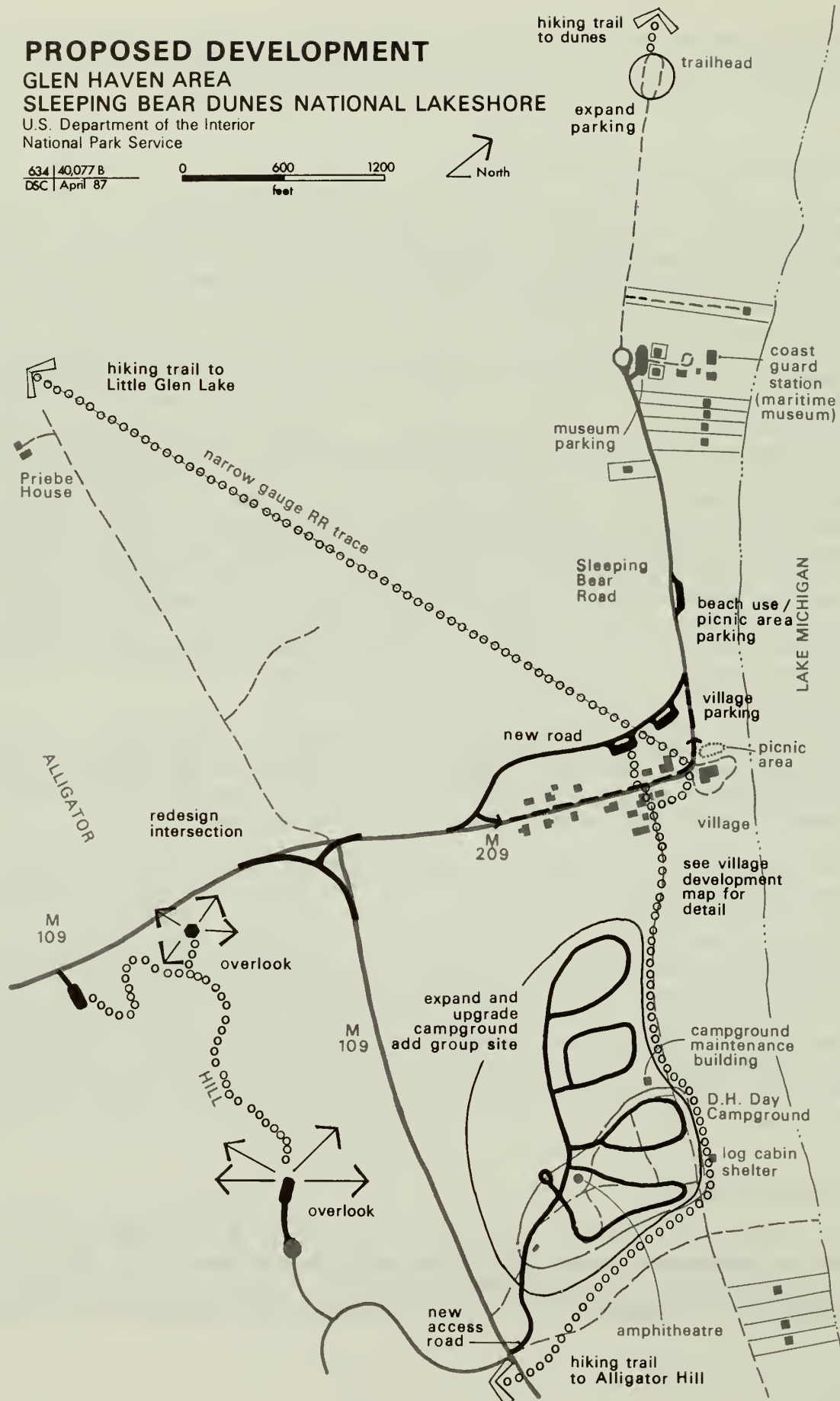
GLEN HAVEN AREA

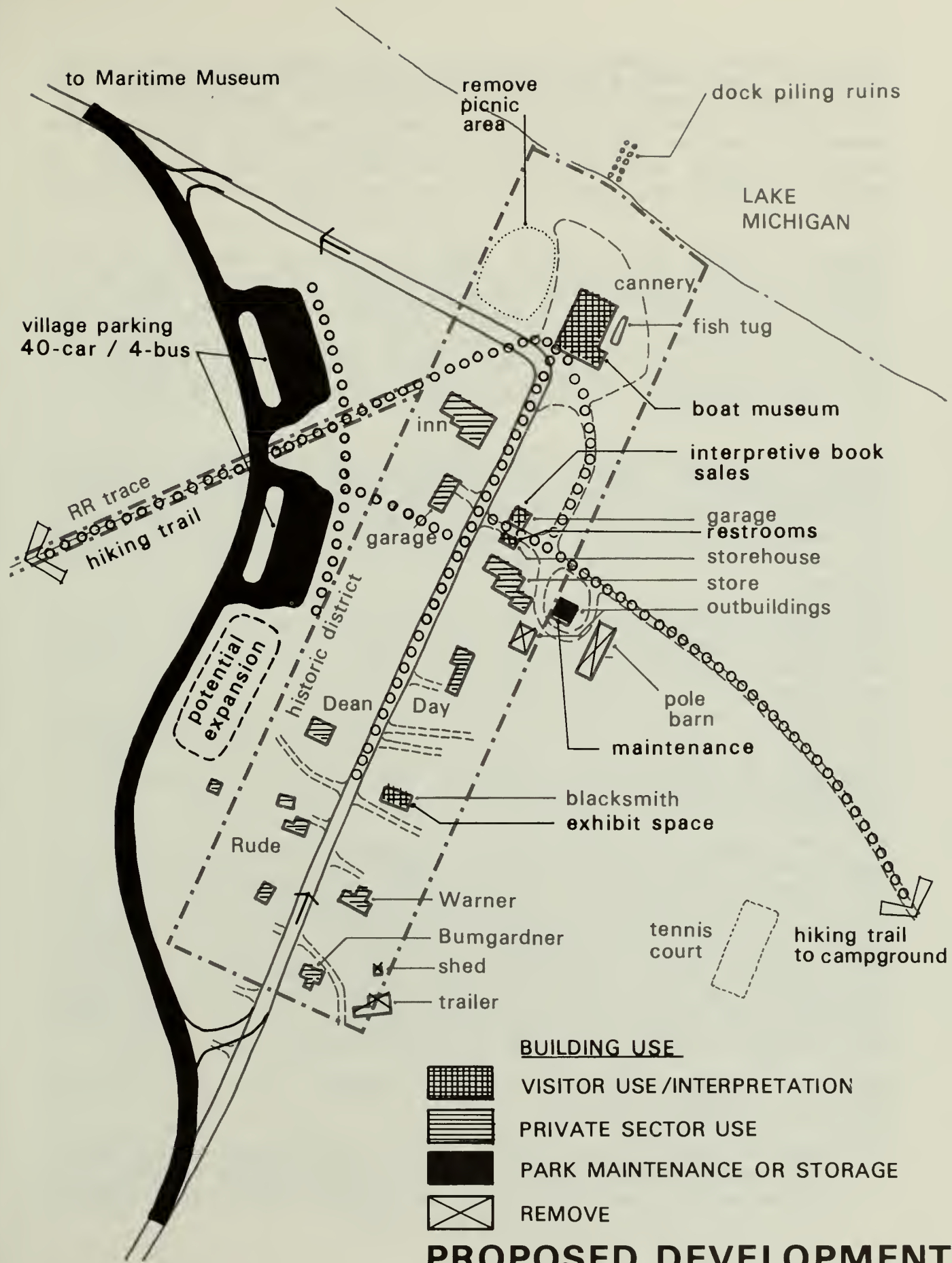
SLEEPING BEAR DUNES NATIONAL LAKESHORE

U.S. Department of the Interior
National Park Service

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DSC | April 87

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BUILDING USE



VISITOR USE / INTERPRETATION



PRIVATE SECTOR USE



PARK MAINTENANCE OR STORAGE



REMOVE

PROPOSED DEVELOPMENT

GLEN HAVEN VILLAGE

SLEEPING BEAR DUNES NATIONAL LAKESHORE

U.S. Department of the Interior / National Park Service

may be selected for museum case exhibits. This should not become a major occupier of space because the primary use should be to display boats. The fishing equipment display, in a separate room, will be developed as a look-into display, probably by sealing the open windows with plexiglass. The cannery will not be regularly staffed, but when a roving interpreter is available, programs will be offered. One simple panel will interpret the cannery's historic use. Some work will be done to the building to provide handicap access and to seal it against weather and dirt.

Because it relates to the fishing theme for the area, the fish tug will continue to be displayed adjacent to the cannery. It will be kept in its current location because it is somewhat hidden from view by the cannery building. It should not be a dominant feature of the view; but rather, the tug should merely be an extension of the indoor boat display and outside only because it is too big to place in the cannery. An exhibit will interpret it, and a viewing platform will be built next to the tug to allow visitors to look inside the cabin.

A floor will be installed in the blacksmith shop and objects related to historic activities, such as agriculture and logging, will be displayed. These objects will be selected for their appropriateness, with definite ties to the village themes. It will not be staffed. Although the exterior signs will identify the building as a museum exhibit, a simple panel on the inside could interpret the historic blacksmithing function. Handicap access will be provided.

The proposed walking tour guide for the village will be part of an existing folder series developed by the lakeshore staff. Folders in the series include one on each island, various hiking trails, and other features. They are attractive, have a family resemblance, and contain text, graphics, and photographs. The park staff has a good collection of historic photographs, some of which could be used in the walking tour folder. The self-guiding folder will be available at a wayside kiosk in the parking lot. General orientation to the village will be given until the market indicates that a more lengthy publication is desirable.

The double garage north of the store will be used for cooperating association sales. This is the only place in the general vicinity that visitors will have access to such an outlet. Half the building will be designated for this use. It may be staffed by a park employee, volunteer, or by association personnel who could also dispense park information. It will be a seasonal operation capable of opening and closing easily, depending on staffing availability and demand. The sales items will not overlap much with those in the general store. At some future time, the other half of the double garage building may be developed for another interpretive use, such as an exhibit area, but for the life of this plan the need has not been demonstrated.

About 10 wayside exhibits will be provided for the following information/interpretive purposes:

Orient visitors to the village--install a high-profile, perhaps multi-panel exhibit at the parking lot which includes a folder dispenser (for village walking tour). A collage of historic photos and an oblique aerial photo of the village might be included.

Interpret village/lake interface, specifically the dock and the ships that used it and the islands that can be viewed

Orient users to the Sleeping Bear Point trail

Interpret the fish tug

Interpret the D.H. Day Farm

Interpret the view from an overlook southeast of the village near M-109. A one- or two-panel exhibit could be used. The trail to the overlook will begin at a roadside parking area

Interpret the view from the Quick overlook

Orient users of the hiking trail from campground to village

In addition to these waysides, a coordinated sign system will be developed to identify the functions of various village buildings. They should be in keeping with the historic setting. Integrated road signs are also needed to provide safe conditions and adequate notice of features (coordinated with the state).

The storehouse for the D.H. Day Store will be converted to a public restroom to serve the village. The structure will be accessible to handicapped visitors. A water and septic system will be installed to serve this facility.

Adaptive Use of Historic Structures

Other historic buildings in the village will also be adaptively used, if feasible, because they are not needed for visitor services, interpretive space, park administration, or other park management functions. Therefore, they will be advertised for lease for appropriate uses to others under the historic properties leasing program. These may include restaurants, lodging, hostels, stores, arts and crafts shops, bed-and-breakfast operations, studios, or private residences. If the proposed adaptive use will provide "necessary and appropriate commercial services to a substantial number of park visitors, then the building may be made available under a lease, and the use may be administered through a concession contract. It is intended that the primary historic structures, the Sleeping Bear Inn and the D.H. Day Store, be open to the public and handicap accessible if feasible. Preference will be given to traditional uses at the inn and store. Other leased structures may or may not be open to the public depending on their eventual use. A "request for proposals" will be issued for vacant structures to solicit interest in leasing. Structures currently under occupancy agreements will be leased when the use terms expire. Building interiors may be remodeled to accommodate the approved use, but in all cases, exteriors will be preserved. Small signs will identify adaptive uses, but they will be designed to be compatible with the historic scene.

If any of the historic buildings cannot be adaptively used by the private sector, the Park Service will continue to stabilize and maintain the structures until adaptive uses can be arranged.

Administrative Facilities

One of the houses in the village will be used as a park residence, as proposed in the quarters management plan recently approved for the park. A park ranger living in the area will help provide some protection to the structures.

Limited maintenance space is needed to support park operations in the Glen Haven area. A storage space for materials and workspace for historic preservation activities should be provided. Because these activities can cause an intrusion on the visitor experience and historic scene, they will be housed in a nonhistoric building just outside the historic district behind the D.H. Day Store (when the use and occupancy agreement expires in 1993).

Nonhistoric Structures

Other nonhistoric structures, including a steel pole barn and a concrete block garage behind the store, will be removed to reduce maintenance costs. These structures were constructed in modern times to support the dune ride operation that was eliminated in 1978. They do not contribute to the historic scene according to the National Register nomination forms. Because these structures are still under a use and occupancy agreement, they will not be removed until the term expires in 1993. Because the pole barn is a usable structure, it may be relocated to another maintenance area in the park.

A modern house trailer behind the Bumgardner house will be removed. A structure west of the Rude house was not inventoried in the special history study for Glen Haven (NPS, "D.H. Day's Kingdom" 1984b). The structure will be preserved until an evaluation determines if it contributes to the character of the historic district. If historic, it will be leased for private uses; if nonhistoric, it will be removed.

The curling court and tennis court east of the blacksmith shop are not within the district but relate to the recreation theme. The curling court is in an advanced state of deterioration. Both are considered archeological resources that will be allowed to deteriorate naturally.

Maritime Museum

Use of the Coast Guard station as the center for maritime history interpretation will continue. Adaptive rehabilitation, exterior restoration, interpretive exhibits, and site development are essentially complete. Two adjacent houses (Fitzgerald and Jacklin) are under long-term use agreements until 1998 and 2002. These structures were not included in the National Register nomination for the station but will be reevaluated because of their relationship to the Coast Guard activities (they provided housing for

families). If determined eligible, the structures' exteriors would be preserved. If not, the buildings would be removed when the use and occupancy terms expired.

The museum parking area is adequate but operates near capacity during the peak season. The 1979 GMP proposed that the dunes area trailhead be combined with the Coast Guard station parking. This DCP proposes retaining the museum parking at its current capacity and leaving the trailhead in its current location. While future increases in visitor use may cause demands beyond the museum parking capacity, it is considered to be an appropriate size for the capacity of the museum itself. Therefore, parking area expansion is not recommended. The recently completed turnaround at the end of Sleeping Bear Road has been leased to Leelanau County for 99 years and will remain unchanged. The access road to private residences west of the museum should be consolidated with the trailhead road to reduce potential visitor confusion and improve safety near the turnaround.

Trails

Glen Haven area trails will be developed as generally proposed in the GMP. A loop trail will be designated in the dunes area; however, the existing gravel trailhead near the dunes will be retained and expanded by 10 cars to accommodate increased use. The gravel access road will be widened to meet park road standards if traffic increases to more than 100 vehicles per day (average daily traffic) during the summer.

A hiking (not bicycle) trail will connect Glen Haven to Little Glen Lake using the old narrow gauge railroad grade. The village parking area will serve as a trailhead. Accessible trails will provide circulation in the village and connect to the D. H. Day Campground. A hiking trail will connect the campground to the Alligator Hill area forming a continuous trail system in the Glen Lake area, as envisioned by the GMP.

Campground

The D.H. Day Campground will be extensively rehabilitated and upgraded as proposed in the GMP. It will be redesigned for about 125 sites (the original capacity), and group sites for about 80 people will be included. Paved roads, showers, and flush toilets will be provided. A water system and sewage disposal system will be developed. The type of sewage system will be determined during the campground design. A portion of the new sites and toilets will be handicap accessible. The entrance road will be realigned to match Stocking Drive (see Proposed Development map), and the amphitheater, which is currently in the center of the campground, will be relocated to a more appropriate site. It will also be designed to accommodate handicapped persons. The exhibit on the history of the campground will be maintained outside the log cabin shelter building. Because the log cabin has interpretive uses and may be eligible for the National Register of Historic Places, it will be preserved for an interpretive shelter. Interior lighting will be added to make the building more usable for interpretive programs.

Beach Use and Picnic Facilities

As discussed above, the village parking area will continue to provide for some beach users, as it has in the past. To provide another option and to reduce pressures on the village parking, a small (up to 10-car) parking area will be developed between the village and the Coast Guard station. The parking will occupy an area that was previously disturbed for former houses (see Proposed Development map).

The GMP proposed one picnic area near the main parking area. This DCP proposes a small (up to five-site) picnic area at the beach use parking area described above. This will remove developed picnicking areas from the village historic district.

Overlook

The GMP proposed a developed overlook on Alligator Hill southeast of Glen Haven. This DCP recommends two overlooks with a connecting trail (see Proposed Development map). The sites offer excellent views of Lake Michigan, Glen Haven, and the D.H. Day Farm near Little Glen Lake. They offer an opportunity to visually tie the entire Glen Haven story together. One overlook near M-109 will be accessible only by trail. The other one, at the Quick place, will be accessible by vehicle when it is developed.

The overlook site near M-109 offers the best 360° view of the entire area (with some vista clearing). A small (up to 10-car) parking area will be provided at the base of the hill. A wayside exhibit at the parking area will interpret the D.H. Day Farm. Waysides at the overlook will address the entire area. The Quick site has good road access and is already disturbed by residential development. A small (up to 10-car) parking area and wayside exhibits will be provided. The Quick overlook is a long-range proposal. The property is federal land under a life estate agreement, which permits lifetime occupancy by the former owner. The overlook will not be developed until the residence is vacated, at which time the structures will be removed.

Table 3 summarizes the proposal, as well as alternatives being considered during preparation of the development concept plan. The alternatives are described in further detail below.

IMPLEMENTATION COSTS AND PRIORITIES

The estimated development costs to implement the proposal and alternatives are displayed in table 4. The annual operations impact assessment is included in appendix B. The costs for remodeling the Sleeping Bear Inn and other historic structures proposed for private sector use are contingent upon specific uses that will be solicited through proposals under the historic properties leasing program. The Glen Haven Store will be available for leasing when the use and occupancy term expires in 1993.

Because of its historic significance and vacant status, the highest priority for implementation is leasing the Sleeping Bear Inn for adaptive use, such as lodging and/or food service functions. A request for proposals will be issued to identify specific procedures and to formally solicit interest in the inn (including the garage). Other vacant structures in the village will also be leased as soon as possible so that occupants of the structure can maintain them.

Another high priority is the new parking area for the village. It will be constructed in conjunction with the road realignment project, which is probably several years away. The small beach use parking area, village restrooms, completion of the cannery interpretive center, and installation of interpretive waysides and signs are other high priority items.

The interpretive development costs are summarized in table 4. Additional details of the proposal are as follows.

	<u>Gross Cost</u>
Waysides	<u>\$ 53,000</u>
Cannery boat museum	
Text panels and case exhibits	40,000
Handicap ramp	2,000
Fish tug viewing platform	4,000
Blacksmith shop exhibit building	
Floor installation	7,000
Handicap ramp	2,000
Text panels	18,000
Store garage (association sales)	
Remodeling	45,000
Furnishing	<u>9,000</u>
	\$180,000

Table 3: Comparison of Glen Haven Proposal and Alternatives

	Proposal	Alternative 1 No Action	Alternative 2 Extensive Interpretive Development	Alternative 3 GMP Proposal
Historic structures management	Exterior preservation, inter- pretation, and adaptive use	Preserve exteriors only	Restore to 1920s and maximize interpretive use	Maximum adaptive use
Cannery	Boat museum (maritime history theme)	Continue boat museum	Interpretive center for village themes	Private sector use
Sleeping Bear Inn	Private sector use open to public	Continue exterior preservation	Private use open to public	Private use open to public
Sleeping Bear Inn garage	Private use with inn	Continue exterior preservation	Exhibit building for Glen Haven history	Interpretive overview exhibits
D.H. Day Store	Private use open to public	Preserve exteriors when use terms expire	Refurnished 1920s store	Visitor orientation center

Proposal	Alternative 1 No Action	Alternative 2 Extensive Interpretive Development	Alternative 3 GMP Proposal
D.H. Day Store garage	Interpretive book sales	Public restrooms	Park maintenance
D.H. Day Store storehouse	Public restrooms	Park storage	Public restrooms
Blacksmith shop	Interpretive space for industry theme	Furnished display for logging theme	Private use
William Day house	Private use	Interpretive displays/D. H. Day empire theme	Private use
Warner house	Private use	Interpretive space	Private use
Bumgardner house	Private use	Preserve exterior	Private use

	Proposal	Alternative 1 No Action	Alternative 2 Extensive Interpretive Development	Alternative 3 GMP Proposal
Rude houses	Private use	Preserve exterior when use term expires	Private use	Private use
Dean house	Private use	Preserve exterior when use term expires	Private use	Private use
Village area non- historic structures	Use one building for maintenance-- remove others; no action on curling court or tennis court	No action	Use one building for maintenance-- remove others; stabilize curling and tennis courts	Remove
Coast Guard station houses	Preserve exteriors or remove	No action	Exhibit space	Remove
Vehicular access in village	Provide one-way access	No change	Prohibit private vehicles	Prohibit private vehicles during summer
Roads	Develop new road around village; encourage state to redesign M-109/209 intersection	No change	Realign M-209 around village; obliterate portion of Sleeping Bear Road	Develop major by- pass to lifesaving station

	Proposal	Alternative 1 No Action	Alternative 2 Extensive Interpretive Development	Alternative 3 GMP Proposal
Village parking	Develop 40-car/4-bus parking area along new road	Use former dune ride parking area between cannery and D. H. Day Store	Develop 70-car/7-bus parking area along realigned M-209	Develop 225-vehicle parking near M-109/209 intersections; 20-car parking behind inn
Transportation system	Encourage county transportation system	No action	Encourage county transportation system	Provide shuttle system during summer
D.H. Day Campground	Redesign/upgrade (125 sites) and add group campsites	No action	Expand by approximately 35 sites to restore capacity to 125 sites (no redesign on existing)	Redesign/upgrade (125 sites) and add group campsites
Picnic area	Develop picnic area near beach use parking	Maintain small picnic area adjacent to cannery	Place picnic tables near parking areas	Develop picnic area near shuttle parking area
Fish tug	Maintain next to cannery	No action	Move to site just outside historic district	Relocate completely outside Glen Haven Village area

	Proposal	Alternative 1 No Action	Alternative 2 Extensive Interpretive Development	Alternative 3 GMP Proposal
Trails	Develop trail system as in GMP with hiking trail on RR grade	Maintain existing trails	Develop as in GMP except no designated trail in dunes or to Alligator Hill	Develop trail system as in GMP
Dunes trailhead	Enlarge parking (10 cars)	Maintain near dunes	Relocate to maritime museum area	Relocate to Maritime Museum area
Beach use parking	Develop 10-car parking area between village and Coast Guard station	Continue use of existing parking area and village parking	Develop three 5-car parking areas between village and Coast Guard station	Continue use of existing parking and new shuttle parking area
Maritime Museum (Coast Guard station) parking	No action	No action	Add 25-car/2-bus parking area for trailhead and maritime museum overflow	Maintain existing 30-car parking area at maritime museum
Overlook	Develop overlooks at Quick property and near M-109 on Alligator Hill	No action	Develop overlook at Quick property only	Develop overlook near M-109 only

Table 4: Glen Haven Development Cost Estimate

<u>Phase Proposal</u>		<u>Alternative 2</u>	<u>Alternative 3</u>
Village restoration	1-4	N/A	N/A
Boat museum	1	Adapt cannery	Adapt cannery
Exhibit building	2	Adapt blacksmith shop	Adapt blacksmith shop
Association sales	2	Adapt store garage	Adapt inn garage
Village restrooms	2	Adapt storehouse (340 sf) utilities	Adapt garage (816 sf) utilities
Roads	2	Village road (1,700 lf)	Realign M-209 (1,700 lf) Obliterate 600 lf
	2	Redesign M-109/209 intersection (1,000 lf)	Redesign M-109/209 intersection (1,000 lf)
Village parking	2	40-car/4-bus	210-car/15-bus 20-car/1-bus
Building removal	1-4	16 buildings	18 buildings

Phase		Proposal	Alternative 2		Alternative 3	
D.H. Day Campground	3	Redesign 125 sites (complete)	819,000	33,000	Redesign 125 sites (complete)	819,000
		Group campground	24,000	50,000	Group campground	24,000
		Obliterate/revegetate	66,000	79,000	Obliterate/revegetate	66,000
		New entrance station	124,000	52,000	New entrance station	124,000
		New dump station	59,000	26,000	New dump station	59,000
		New amphitheater	66,000	66,000	New amphitheater	66,000
Picnic area	2	5-site	5,000	N/A	20-site	21,000
Trails	4	Hiking trail (5 miles)	98,000		Hiking trail (2 mi.)	39,000
		Accessible trail (2 miles)	194,000		Accessible trail	194,000
					Bicycle trail	291,000
Dunes trailhead	2	Add 10-car area	10,000	49,000	N/A	
Beach use parking	2	Develop 10-car area	20,000		N/A	
Waysides	1-4	10 waysides	53,000	53,000	10 waysides	53,000
	4	Parking (two 10-car areas) Trail	39,000 13,000	20,000	Parking (10-car) Trail	20,000 7,000
			Construction cost	\$1,767,000		\$3,227,000
			Design cost	337,000		616,000
			Total cost	\$2,104,000		\$3,843,000
				+ restoration costs		

Note: Construction costs are gross figures which include 31 percent of net construction costs for project supervision and contingencies. Design costs include advance and project planning that add approximately 25 percent of net construction to the gross construction costs.

ALTERNATIVES

The following alternatives are organized in the same manner as the proposal. The access and building functions have been combined into a comprehensive package; however, the functions could be split between alternatives if desired. For example, access proposed under alternative 1 could be combined with building functions proposed under alternative 3. For a summary comparison of the proposal and alternatives, see tables 3 and 4.

ALTERNATIVE 1 - NO ACTION

Under this alternative, no action would be taken to realign or otherwise improve existing roads in the area. Village parking would continue to be next to the cannery. Overflow parking would be permitted in a grassy area just south of the cannery that was formerly used for the dune ride operation (see Existing Conditions maps).

The cannery would continue to be used as a boat museum. Visitors would take a self-guided tour of the village, obtaining interpretive information from a booklet or other literature. Vacant historic buildings would continue to receive exterior preservation only. As use and occupancy terms expired, the National Park Service would assume more maintenance responsibilities on the additional historic buildings.

The existing design and facilities of the D.H. Day Campground would be maintained. No action would be taken to relocate or modify the Sleeping Bear Point trailhead, and no changes in the trail system would be made. An overlook would not be developed.

ALTERNATIVE 2 - EXTENSIVE INTERPRETIVE DEVELOPMENT

The concept of this alternative is to emphasize interpretive use and development in the village area and to upgrade/redesign the D.H. Day Campground. The village would be restored to its 1920s appearance. As in the proposal, M-209 would be realigned to bypass the village. However, the stretch of Sleeping Bear Road from the cannery west approximately 600 feet would be obliterated (see alternative 2 maps). The abandoned portion of M-209 would be closed to visitor traffic, restored to its historic appearance, and used for pedestrian circulation. It would only be open to emergency vehicles and village residents as needed and to service vehicles during off-hours. A larger series of parking areas, to accommodate approximately 75 vehicles, would be developed adjacent to the new road west of the village. The greater capacity is needed because of the additional interpretive activities and increased length-of-stay that would likely occur under this alternative.

As stated above, the village would be restored to the 1920s. This was a period of transition for Glen Haven and other lakeshore communities. Glen Haven changed from a rustic lumber town to a painted and spruced-up resort community. Because of the extensive building and remodeling done in the 1920s, an older time period would require substantial alterations to the

ALTERNATIVE 2

GLEN HAVEN AREA

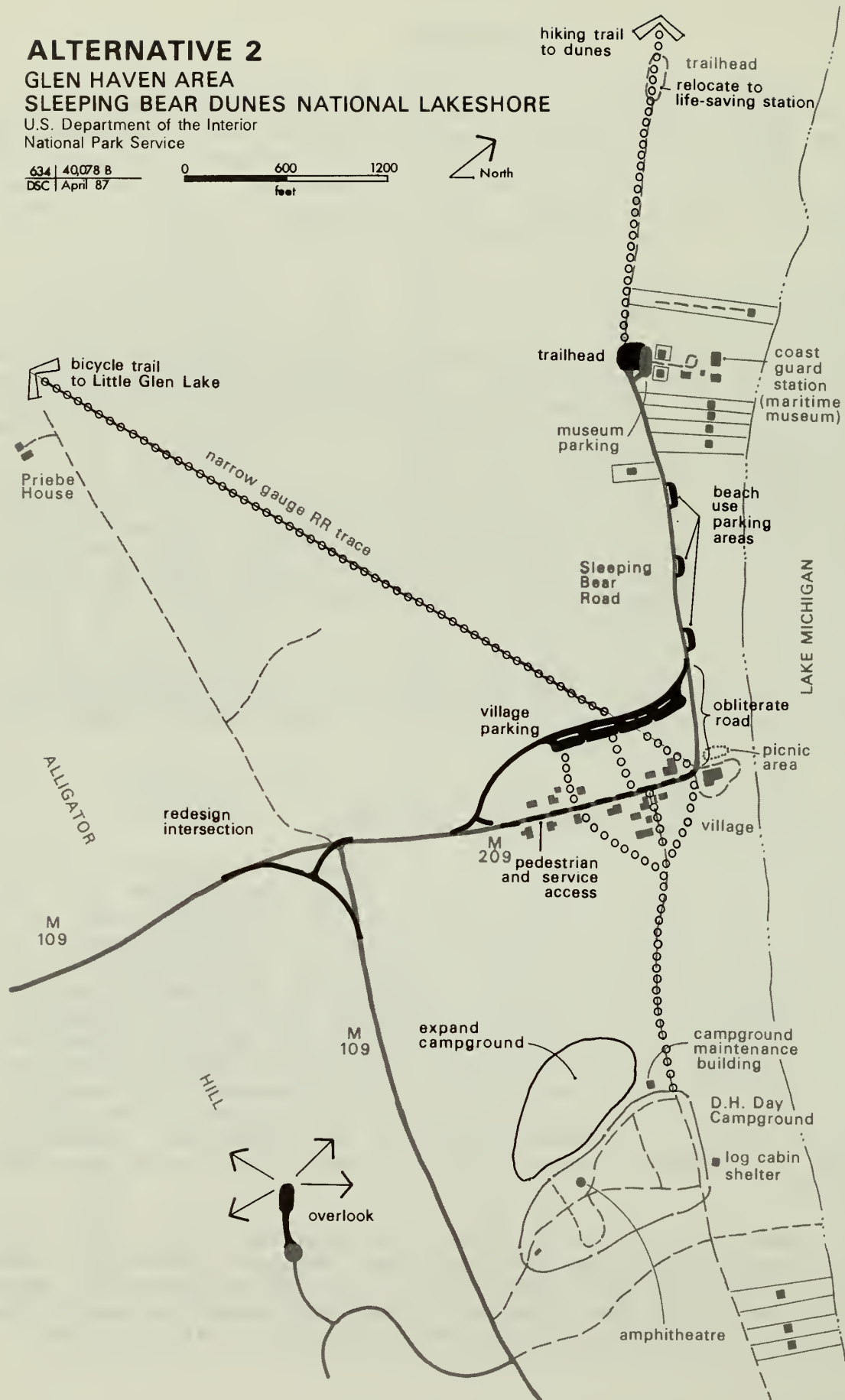
SLEEPING BEAR DUNES NATIONAL LAKESHORE

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buildings. In the 1920s, buildings, equipment, and tools of the town's earlier logging and fishing industries would have been present; the fruit processing and steamship businesses would have been in progress; and future plans as a resort community would have been in preparation.

Structure exteriors and the historic landscape would be restored to their 1920s appearance. In addition to restoring existing structures, a number of items related to logging and shipping, which are no longer present, would be reconstructed or replaced in the village. These include the narrow gauge railroad track, one or two train cars as exhibits, a short section of the dock near the cannery, lumber stacks in the dock area, and a native American house illustrative of those once found in the area. The details of a restoration/reconstruction program would be developed in a comprehensive historic structure/cultural landscape report.

Overview interpretation, orientation, and restrooms would be provided at the cannery. The Sleeping Bear Inn would be privately used as in the proposal. The D.H. Day Store would be refurnished as a 1920s company store and could sell some items as historical souvenirs. The blacksmith shop would be used to interpret the logging industries, and the Warner house would be refurnished to interpret homelife in the company town. The Bumgardner house would have exterior preservation only and could be interpreted by an exterior wayside exhibit. The garage south of the inn would house a series of interpretive exhibits describing the Glen Haven history. The garage north of the D.H. Day Store would be used for public restrooms. One of the two small outbuildings east of the store would be used for park maintenance; the other would be removed. Other residences in the village would be used as private or park staff residences. The curling and tennis courts would be stabilized as interpretive exhibits. The fish tug would be relocated about 100 feet east of the cannery to move it just outside the historic district boundary.

The D.H. Day Campground would be expanded by approximately 35 sites to restore the capacity to about 125 sites, while retaining the site density at a lower level than the original state campground. This would be accomplished by adding a new loop or extending existing loops on the west side of the campground. The existing design would be retained with possible minor modifications to provide for circulation in accommodating the new loop(s). Waterlines would be extended and vault toilets would be added to serve the new sites. An exhibit on the history of the campground would be developed at the historic shelter building and interior lighting would be improved. The Sleeping Bear Point trailhead would be relocated to the Coast Guard station area, and only the Quick overlook would be developed. Trails in the study area would be developed as proposed in the GMP, except that there would be no designated trail in the dunes area and no connection to Alligator Hill. Three small (5-car) beach use parking areas would be developed along Sleeping Bear Road between the village and lifesaving station.

ALTERNATIVE 3 - GENERAL MANAGEMENT PLAN PROPOSAL

This alternative is the most consistent with the concept identified in the 1979 GMP. As shown on the Alternative 3 maps, M-209 would be realigned to the west and north to connect with Sleeping Bear Road at the turnaround south of the Coast Guard station. There would also be a connection from the

ALTERNATIVE 3

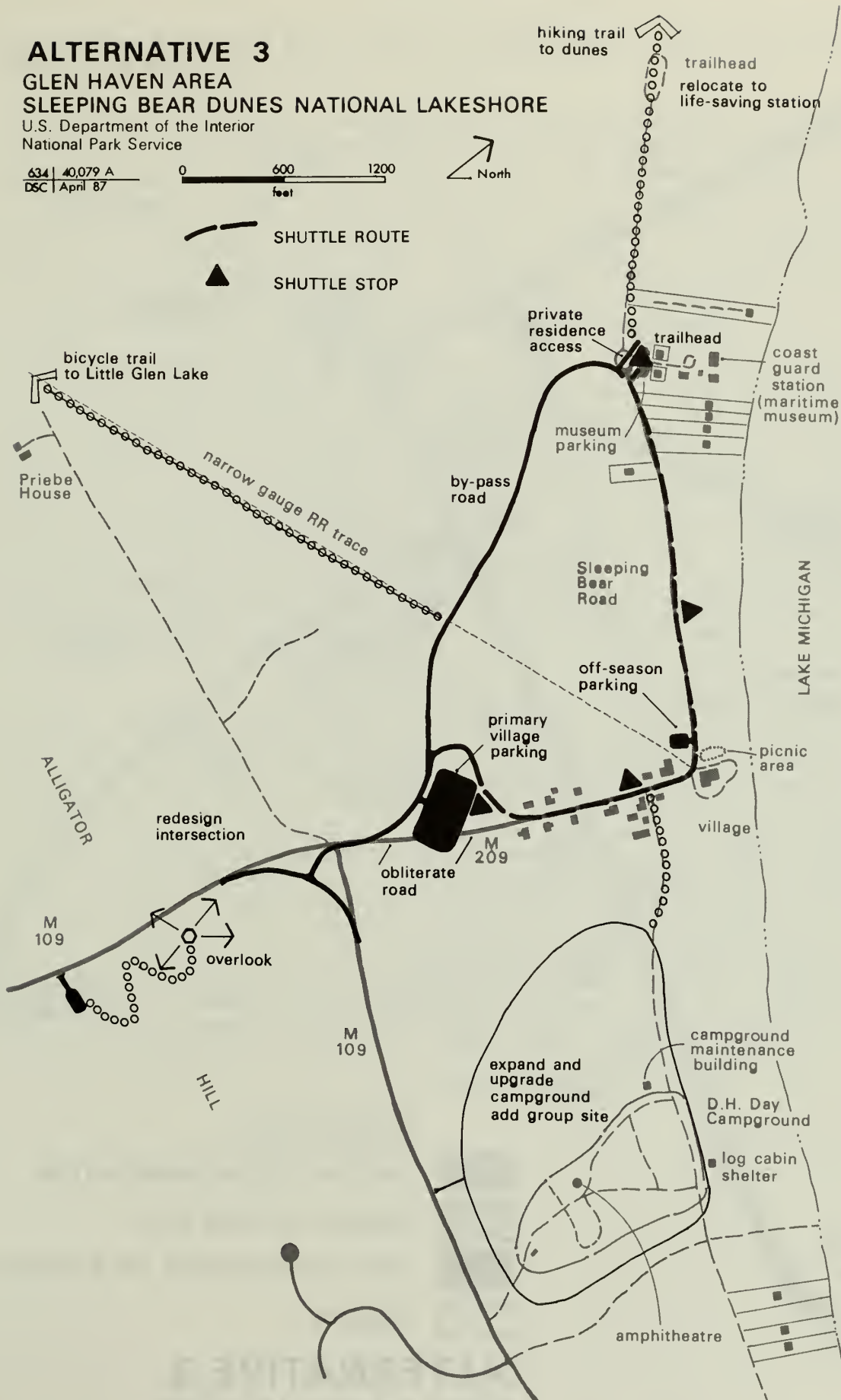
GLEN HAVEN AREA SLEEPING BEAR DUNES NATIONAL LAKESHORE

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National Park Service

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DSC | April 87



- SHUTTLE ROUTE
- SHUTTLE STOP



new M-209 to the old M-209, creating a loop road. The abandoned section of M-209 would be obliterated.

Visitors would park at a large parking area (approximately 225 vehicles) southwest of the village. During the peak season, a shuttle would operate with stops at the parking area, the village, the beach, and the lifesaving station. No visitor traffic would be allowed past the main parking area, but the road would be open to local residential traffic, service and emergency vehicles, as well as the shuttle. When the shuttle is not operating, the road would be open to visitor traffic, allowing visitors to park at the main parking area, in a small (20-car) parking area behind the inn, or at the Coast Guard station, as they chose.

To provide a primary shuttle stop central to the village, general orientation to the area would be provided at the D.H. Day Store. Overview interpretation of the Glen Haven story would be provided at the Sleeping Bear Inn garage across the street from the store. The Sleeping Bear Inn would be leased for private-sector uses, as in the proposal, but without the garage. The cannery would serve as a boat museum and would interpret the shipping and fishing industries. However, the fish tug would be relocated out of the Glen Haven Village area and placed somewhere else in the park. Public restrooms would be located at the main parking area and in the D.H. Day Store storehouse (adjacent to the store). The store's garage would be used for park maintenance, and nonhistoric structures in the village would be removed. All other historic structures would be leased for private uses as discussed in the proposal.

As in the proposal, the campground would be extensively redesigned and upgraded. It would be expanded to provide 125 family campsites and group campsites for about 80 people. Paved roads, showers, and flush toilets would be added. As in alternative 2, the Sleeping Bear Point trailhead would be relocated to the lifesaving station parking area, and the existing trailhead parking would be obliterated. Trails in the study area would be developed as generally proposed in the GMP. An overlook was not located in the GMP. However, in this alternative an overlook would be developed at a site on the east side of M-109 where it cuts through Alligator Hill. A 10-car parking area and a D.H. Day Farm wayside exhibit would be developed, and a trail would be constructed up to an overlook on top of Alligator Hill that provides good views of Lake Michigan, Glen Haven, and the Little Glen Lake area. Some minor vista clearing of trees on the north slope of Alligator Hill would be needed to enhance the Glen Haven view. A wayside exhibit would interpret the historic landscape below.

ENVIRONMENTAL CONSEQUENCES

IMPACTS OF THE PROPOSAL

Natural Environment

Soils. A new septic system would be needed to serve the proposed public restrooms in the village. The leachfield would be installed northeast of the D.H. Day Store near the former dune ride parking lot. The soils and vegetation have been previously disturbed, and the site is now a large open grassy area. Wastewater would be placed under the soil, and nutrient values would increase. Where transpiration is high, substances in the wastewater would build up in the soil. Local buildups of soil moisture would cause water to occupy more intraparticulate space, affecting growth on the site.

Roads, parking areas, trails, and other impermeable surfaces would either wholly or partially eliminate direct water inflow to the soil. Soils would be compacted under these facilities, and site preparation (leveling) would result in either removal or addition of earth, destroying the soil structure. Topsoil would be stockpiled and reused following construction activities.

Imported topsoil would be used to supplement any shortage of native topsoil incurred in installing utilities or other facilities. This would minimize the overall loss of topsoil caused by development.

Acreages affected from proposed parking lots and roads are summarized below:

<u>Development</u>	<u>Acreage</u>
New road (1,700 feet)	1.3
Village parking (40-car/4-bus)	.5
Trailhead parking addition (10-car)	.25
Beach use parking (10-car)	.25
Campground redesign and upgrade	5.0
Quick property overlook parking (10-car)	.5
D.H. Day Farm overlook parking (10-car)	.5
M-109/209 intersection redesign	1.1

The redesign of the campground includes showers and flush toilets, which would require development of a central sewage system or individual septic systems. Placement of the expansion would be located to minimize impacts on the site.

The campground improvement, trail development, and the M-109/209 intersection redesign concepts and impacts would remain as proposed in the Assessment of Alternatives for the General Management Plan (NPS 1979c). A project-specific environmental assessment may be needed for the intersection redesign when additional details are developed.

None of the land in the study area has been determined to be prime or unique farmland by the Soil Conservation Service.

Vegetation. Road, trail, and parking area construction would completely destroy existing vegetation. The exact location of these developments would be sited to take advantage of natural vegetation that would minimize impacts.

Increased nutrient values in soil beneath filter fields differ in effect, depending on concentrations of nutrients and the plant species present. Lower levels of nutrient enrichment generally promote plant growth, but increasing concentration progressively retards growth, or largely eliminates it, as the tolerance of each species to these chemicals is exceeded.

The precipitation that falls on buildings, roads, and other impervious structures would not be absorbed. To the maximum extent possible, water runoff from impervious structures would be directed to natural drainages, minimizing the impacts of increased moisture availability. In addition, the vegetation along road shoulders would be subject to crushing by vehicles.

Before installation of the septic system leachfield and other facilities, the topsoil would be scraped off and set aside. It would be replaced and reseeded, resulting in more rapid recovery of the site.

The expected increase in visitation and visitor foot traffic would cause some trampling of vegetation and soil compaction. The impacts of trampling would range from complete exclusion of vegetation to slight shifts in species composition.

Floodplains and Wetlands. None of the existing or proposed development is in the 100- or 500-year floodplain. Because the Glen Haven area is relatively protected and the shoreline slopes are gentle, wave runup should not cause significant problems.

The proposal would not affect the three wetland areas included in the National Wetlands Inventory (1980) in the pine-oak-aspen forest and transition zone between the Sleeping Bear Dunes and M-209.

Wildlife. The alteration of vegetation would cause displacement and destruction of resident invertebrates and small vertebrates. New facilities development would result in the displacement and disruption of small mammals and birds using the area.

Threatened and Endangered Species. Populations of the dune thistle or Pitcher's thistle (Cirsium pitcheri) are relatively common on the eastern shore of Lake Michigan, where glacial and post-glacial dune features provide suitable habitats. The thistle is found along the shoreline in the study area. The thistle should receive little if any impact from increased visitation because visitors to the beach tend to use the nonvegetated areas of the beach. The proposed beach parking area would be on a site that might have been habitat for the thistle; however, the site has been previously disturbed by residential construction. Potential damage to the thistle through informal pathways from the road to the beach would be reduced with the development of beach parking and designated beach access trail.

The piping plover (Charadrius melodus) is the only endangered bird that has the potential to be affected by beach use. The beach near Glen Haven has been used by the Piping Plover in the past. Currently the only known nesting site in the Glen Lake area is along the beach north of the Sleeping Bear trail. This portion of the shoreline is outside the study area; however, park staff would continue to monitor the area for sightings and nesting sites of the piping plover.

Air and Water Quality. Construction activities would temporarily increase the amount of particulates in the area. There would also be a temporary increase in noise levels. Increases in visitation and the number of cars would increase auto emissions. Local impairment of surface water quality would result from runoff contaminants (petroleum by-products, trash, etc.). This effect should be negligible overall.

Cultural Environment

Archeological Resources. Known prehistoric sites in the study area would not be affected. Some historic archeological material behind the inn might be affected by road, parking, and trail construction. In conjunction with more detailed design and before any land-modifying activity, a qualified professional archeologist would inspect the proposed development sites and their immediate vicinity for the presence of cultural remains, both prehistoric and historic. If newly discovered or previously unrecorded cultural remains are found, additional investigations would be made before earth-disturbing activities. If significant remains were discovered, the development would be redesigned or a mitigation plan developed in consultation with the state historic preservation officer. Similarly, in those areas where material were not discovered but subsurface remains appeared likely, a qualified professional would be on hand to monitor land-modifying actions.

Historic Resources. The exterior facades and historic landscapes would be preserved in the Glen Haven Historic District and at the Coast Guard station. Realigning M-209 around the village would remove most of the modern vehicular traffic from the district, enhancing the historic scene. The road would directly affect a small portion of the railroad trace; otherwise, facilities would be outside the historic district. Portions of the new road and parking areas may be visible from the village during the off-season (when the trees are bare). Vegetation screening around the parking areas should reduce this intrusion somewhat. Road and parking area design would be carefully done to avoid or minimize impacts to the historic scene using existing topography and vegetation to screen the new developments where possible.

Wayside exhibits and signs would introduce a nonhistoric element to the historic district, but they would be designed to be as unobtrusive as possible, and they would increase visitor understanding and appreciation for the area's historic resources.

Adaptive use, including private sector use, could result in significant modification to building interiors, depending on the use proposed. Private sector uses may reopen some buildings, such as the Sleeping Bear Inn and the

D.H. Day Store, to public access. Some private sector use, such as residential use, would continue the current condition of no public access to building interiors. Occupied buildings would be better preserved than unoccupied structures, because of the regular maintenance and protection against vandalism they would receive. Increased visitor use could result in excessive wear and tear; however, conditions would be monitored and corrective measures taken to avoid significant deterioration.

Preventive maintenance activities would be done to preserve historic structures. Selected paint colors would be appropriate to the historic scene.

Socioeconomic Environment

Regional Economy. Development of visitor services (lodging, food service, or a store) would positively impact the economy of the area surrounding Glen Haven by creating service-related jobs and the spinoff economic benefits of new businesses.

Visitor Use. Visitation to Glen Haven and the maritime museum in the Coast Guard station would increase because of the development of interpretation and service-related facilities. The expanded capacity in the campground would allow the National Park Service to meet more of the substantial demand for camping in this popular area. The overlooks would provide an aesthetic experience unavailable in the study area and increase interpretive understanding of the landscape. The proposed bypass would reduce pedestrian and vehicle conflicts experienced during the summer in the village area.

The portion of M-209 in the village would be converted to one-way traffic. This might be perceived as an inconvenience by visitors to the area who have traditionally been able to drive both ways through Glen Haven. If heavy use and congestion warranted it, the road would be closed to visitor traffic, further restricting traditional visitor access in the village. Visitors would be required to walk from the new parking area to the village; however, the overall experience in the village would be enhanced.

Crowding and congestion would occur at the maritime museum parking area as visitation increased. This may be relieved somewhat by the proposed beach use parking area that would be developed along Sleeping Bear Road.

IMPACTS OF ALTERNATIVE 1

Natural Environment

Soils. Village area parking would be allowed on the site of the former parking lot for the discontinued dune rides. The soil has previously been compacted and disturbed on this 0.5-acre site.

Vegetation. Use of the former parking area near the cannery would destroy the grass on the site. Continuation of beach parking along the road shoulder and subsequent informal paths to the beach could lead to the destruction of vegetation.

Floodplains and Wetlands. Same as proposal.

Wildlife. No impact.

Threatened and Endangered Species. The effects would be the same as those listed in the proposal, with the exception of the thistle. Parking along the shoulder of the road and the accompanying informal pathways could destroy vegetation, including the review species plant, Cirsium pitcheri.

And and Water Quality. No impact.

Cultural Environment

Archeological Resources. Same as proposal.

Historic Resources. There would only be exterior preservation of village buildings. Continued deterioration would result from nonoccupancy in some of the buildings and the associated problems, such as vandalism, roof leaks, and lack of continual maintenance. The nonhistoric buildings would remain as intrusions in the historic district. The visual intrusion resulting from parking in the village would continue and increase as visitation grew.

Socioeconomic Resources

Regional Economy. No impact.

Visitor Use. The visitor experience in the village would continue to be limited. Informal parking in the village would continue to cause visitor confusion and inconvenience. Campers would continue to be turned away from the D.H. Day Campground during the summer because demand would outstrip capacity.

IMPACTS OF ALTERNATIVE 2

Natural Environment

Soils. Except for the differences noted below, the impacts on soils are similar to those mentioned for the proposal.

The impacted acreage figures for proposed parking lots and roads are summarized below:

<u>Development</u>	<u>Acreage</u>
New road (1,700 feet)	1.3
Village parking (70-car/7-bus)	1.5
Maritime museum/trailhead parking (25-car/2-bus)	.5
Beach use parking (three 5-car lots)	.7
Campground expansion	1.0
Overlook parking	.5
M-109/209 intersection redesign	1.1

A new loop in the D.H. Day Campground would require minor grading for road and campsite construction. The exact alignment of the road would be located to take advantage of natural terrain and to minimize impacts. The new waterlines would be laid within the road corridor. The amphitheater is small, and its impact on soils and other resources would be negligible.

Vegetation. Same as proposal.

Floodplains and Wetlands. Same as proposal.

Wildlife. Same as proposal.

Threatened and Endangered Species. Same as proposal.

Air and Water Quality. Same as proposal.

Cultural Environment

Archeological Resources. Same as proposal.

Historic Resources. Restoring and reconstructing the village buildings and landscape to a 1920s appearance would have a major effect on the existing historic scene. Modern fabric and materials would be removed. If accurate historic data is lacking, some conjecture might be needed to complete proposed restoration and reconstruction projects. Relocating the fish tug just outside the historic district boundary would remove the direct impact on the district but would make it even more visible from most points in the district.

Socioeconomic Resources

Regional Economy. Same as proposal.

Visitor Use. Same as proposal.

The interpretive and recreational opportunities available to the visitor would be greatly increased and improved. Interpretation of the 1920s era would be enhanced, but the post 1920s story would be downplayed.

IMPACTS OF ALTERNATIVE 3

Natural Environment

Soils. Except for the differences noted below, the impacts on soils would be the same as those mentioned for the proposal.

The acreages that would be affected for the proposed parking lots and roads would be as follows:

<u>Development</u>	<u>Acreage</u>
New road (5,100 feet)	4.0
225-vehicle parking lot	4.0
Campground reconstruction	5.0
Overlook parking	.5
M-109/209 intersection redesign	1.1

Redesign of the campground would require expanded sewage services as discussed in the proposal. The roads would be realigned to allow for better circulation and paved to reduce dust problems from passing vehicles.

Vegetation. Except for the differences noted below, the impacts on vegetation would be similar to those mentioned in the proposal.

Beach parking along the shoulder of the road would continue during the off-peak season when the shuttle system is not in operation. Subsequent informal paths to the beach could lead to destruction of vegetation. Minimal clearing would be required for redesign of the campground and road construction. Exact locations would be located to minimize impacts.

Floodplains and Wetlands. The route of the bypass intersects a boggy area observed during a field reconnaissance in November 1985. This boggy area might be the result of Lake Michigan being at a record high level. This area is not listed on available wetland inventory maps. Steps would be taken when siting the bypass route so that impacts on the boggy area could be mitigated. Additional wetlands compliance documentation may be needed.

Wildlife. Same as proposal.

Threatened and Endangered. Same as alternative 1.

Air and Water Quality. Same as proposal.

Cultural Environment

Archeological Resources. Same as proposal.

Historic Resources. Private use of buildings in the historic district would ensure continual maintenance on the buildings and prevent damage common to nonoccupancy associated problems, such as vandalism and roof leaks. The curling rink and tennis courts would be removed. These examples of recreation provided by the company for employees would be lost for interpretation to visitors. The lifesaving station residences would be removed, and the opportunity for interpreting the lives of families stationed at the lifesaving station would be lost. Relocating the fish tug outside the Glen Haven area would remove the impact completely from the historic district. However, the interpretive potential of tying Glen Haven to the commercial fishing theme would be reduced.

Visitor Use. Except for the following differences, the impacts on visitation are similar to the proposal. The shuttle system during the peak use summer months would remove vehicle and pedestrian conflicts in the village. The cost of the shuttle might be prohibitive to some visitors, discouraging use of the village and the Coast Guard station.

CONSULTATION

The National Park Service has consulted with several agencies and individuals during preparation of this plan. The Park Service is undertaking informal consultation with the U.S. Fish and Wildlife Service regarding potential impacts on endangered species, and the state historic preservation officer and the Advisory Council on Historic Preservation about the effects on resources listed on the National Register of Historic Places. The Michigan Department of Transportation and the Leelanau County Road Commission will be consulted on the proposals that affect state and county roads. The DCP/IP/EA will be distributed to appropriate agencies, organizations, and individuals for public review and comment. The document will also be available for review at park offices during the public comment period, and a press release will be issued to identify the document's availability.

APPENDIX A: VISITOR TRANSPORTATION SYSTEM FEASIBILITY

Glen Haven Area
Sleeping Bear Dunes National Lakeshore

April 1986

Maurice L. Miller

Denver Service Center
National Park Service
U.S. Department of the Interior

Introduction

The 1979 General Management Plan (GMP) for Sleeping Bear Dunes National Lakeshore recommends that, to enhance the village atmosphere, private vehicles should not be permitted in the Glen Haven area during the summer season. The GMP also states that a public transportation system may be provided in the area during the peak season for those who cannot walk or prefer not to. Assessing the transportation system's feasibility was determined to be necessary for development concept planning currently underway for the Glen Haven area.

This report analyzes the potential for this service in the immediate vicinity of the lifesaving station and the village as generally recommended in the GMP. It does not, however, address the feasibility or desirability of a larger system that might connect Glen Haven to other nearby attractions such as the Dune Climb and Stocking Scenic Drive.

Park Service Policy

The present policy of the National Park Service is to provide safe visitor transportation services within selected park areas wherever such systems are deemed a desirable alternative to the construction of additional roads, parking and support facilities in prime resource areas, and where these services will improve park experience (NPS 1978). In facilitating use of park units via public transit systems, the National Park Service will work with federal agencies, states, local and regional planning bodies, citizen groups and others in developing and coordinating access to and within parks.

The National Park Service may develop, either through direct employment or by outside efforts, appropriate interpretation programs for use in conjunction with public transit systems within a park area. This service will be provided where such service can offer a genuine learning experience to people.

The National Park Service is to make all appropriate land transportation systems and services, whether provided by the Park Service or by concessioners, accessible to and usable by physically disabled persons unless this action would alter the basic nature of land transportation services. A sufficient percentage of the vehicles should be wheelchair accessible. Until this goal is realized, a separate accessible vehicle will be provided or a disabled person will be allowed to drive his or her personal vehicle on otherwise restricted roadways. No new roads will be developed for the sole purpose of providing disabled visitor access. Accessibility will also be provided for water transportation systems.

NPS Guidelines

Present draft guidelines of the National Park Service (NPS 1984c) pertaining to establishment of a visitor transportation system (VTS) in an NPS unit involves two basic items (funding and criteria for implementing a VTS).

As possible, a new VTS should be self-supporting and operated at no cost to the federal government; instead, the private sector should own and operate the system. Some existing systems are funded by user fees, increases in visitor rates for a variety of goods and services by a concessioner, and by annual appropriations. In some instances, a combination of user fees and annual appropriations are used simultaneously.

The basic criterion for considering a new system is resource protection. A VTS would be an alternative to correct a serious traffic congestion and safety problem where road improvements and/or parking facility construction would have serious impacts on the resources.

Secondly, a VTS should also have a visitor demand that warrants operating a system, have a minimum passenger load factor of approximately 50 percent or more, require less energy than private vehicles providing the same transportation task, and operate economically.

Lakeshore Visitation High Use Months

Table A-1 shows recreation visits during the high use season to Sleeping Bear Dunes National Lakeshore and the Glen Haven Coast Guard Station.

Table A-1: Recreation Visits

Month	Total Lakeshore Visits Average 1977-85	Percent of August Visits	Coast Guard Station Visits Average FY 84-85	Percent of August Visits ¹	Percent of August Visits for Forecasts
June	85,028	35.0	1,377	31.3	34.0
July	242,342	99.8	3,198	92.7	96.0
August ¹	242,906	100.0	9,403	100.0	100.0
September	77,293	31.8	10,148	34.1	32.0

¹ Maximum Use Month

The monthly trends identify that August is the highest use month, closely followed by July, for the lakeshore and maritime museum in the Coast Guard station. Based on historical traffic data, lakeshore visitation data, and studies by the NPS Statistical Unit of the Denver Service Center, it is estimated that the Glen Haven area recorded approximately 1,000 visits per day during August 1985. This includes visits to the maritime museum, the Dunes trailhead near the museum, and the Glen Haven Village and beach area.

Potential Visitor Transportation System Ridership

The average daily visitation figures for August and other high-use months include all of the visitation occurring over that particular month, including high-use visitation days (weekends and holidays) and some days with lower visitation than the average day for the month. In arriving at a number or numbers of potential bus passengers, average day loadings are most important for projecting the number of passenger loadings by month and consequently the total for an operating season.

It may not be practical or feasible to accommodate potential loadings on a peak day (highest use day of season or month) but it may be realistic and necessary to transport most of the potential passengers on high-use days. Based on information from lakeshore staff, weekend days recorded 10 to 20 percent greater visitation levels than on weekdays during the summer. In determining projection factors for potential bus loadings, it was presumed that high-use days would record a level of activity 15 percent higher than on average use days. Table A-2 shows estimated average and high-use day passenger loadings by month for maximum potential loadings. For comparative purposes, 1985 loads were estimated along with 1995 and 2005 loads. A system, if implemented, would probably not be operative until 1995 or at least until visitor facilities are opened in the village.

It is presumed that 100 percent of the visitors would not use a visitor transportation system. Visitors might not use the system if fees were charged to use the system, even if private vehicles were prohibited from using the transit route. It is presumed that private vehicles would not be permitted on M-209 in the village and the road to the lifesaving station if a system was in operation. Visitors might also choose to walk into the village area rather than ride a transit vehicle because walking distance does not exceed 1/2 mile one-way.

The maximum potential loadings in table A-2, amounting to 90 percent of projected total visitation, presumes that transportation would be free to the user and that some would walk to the village.

Due to the uncertainties of funding a system and factors noted above, estimates at 60 percent of total projected visitation levels were developed as shown in table A-3.

Operating Season and Vehicle Type

It was estimated that visitor transportation services would be available during the high-use months in the summer, amounting to 81 days (15 in June, 31 in July, 31 in August, and 4 in September). It appears that an open-air shuttle/tram or light transit bus would be the most appropriate vehicles for transporting visitors in the Glen Haven area. Because of the short distances between stops, a transportation vehicle would be travelling at relatively low speeds. Low traveling speeds and use of the vehicle during the summer permit the use of an open-air, tram-type vehicle.

Table A-2: Average and High-Use Day Passenger Estimates, Glen Haven Area Maximum Loads

Month	Use as a percent of August	Avg. Day Visitation 1985	Avg. Day Loading 1985 ¹	High-Use Day Loadings 1985 ²	Avg. Day Loadings 1995 ¹	High-Use Day Loadings 1995 ²	Avg. day Loadings 2005 ¹	High-Use Day Loadings 2005 ²
June	34	340	305	350	375	430	550	635
July	96	960	865	995	1,055	1,215	1,550	1,785
August	100	1,000	900	1,035	1,100	1,265	1,620	1,865
September	32	320	290	335	350	405	520	600

¹ 90 percent of visitation - presumes that some visitors will walk instead of ride a visitor transportation vehicle and no fee is charged for ridership.

² 1.15 x average day use

Note: Overall lakeshore visitation projected to increase by slightly more than 1 percent per year - Glen Haven area (village and beach, lifesaving station, and trailhead area) visitation projected to increase by 2 percent per year or 22 percent between 1985 and 1995, amounting to 1,220 in 1995, and 4 percent per year or 47.5 percent between 1995 and 2,005, amounting to 1,800 in 2005.

One of the prominent builders of the tram is Chance Manufacturing Company, Inc. The company constructs a power unit capable of pulling three coaches with articulated four-wheel steering. The capacity of the power unit is 21 passengers and each coach can carry 28 passengers. The system provides flexibility in passenger capacity because of increasing or decreasing the number of trailing units, depending on demand. Available options include a public address system, wheelchair accessibility, special paint schemes, and others based on user need.

Electric, battery-powered buses would be environmentally ideal. They consume no fossil fuels, are essentially pollution free, and operate very quietly. However, several disadvantages currently outweigh these positive characteristics. These vehicles have not yet been proven in a rigorous bus operation and they are extremely expensive compared to more standard vehicles. Studies have shown there are no savings in total operating and maintenance costs. Regular maintenance requires that the battery units must be changed and charged after approximately four hours of operation.

Converted vans, light transit vehicles, small modified school buses, and light buses could be considered for use at Glen Haven. They do not provide the flexibility in passenger capacity as the tram with a power unit and one or more trailing units. However, capital and operating costs are lower for these types of vehicles than for the tram system.

For forecasting purposes, a tram unit with a power unit and one or two trailing coaches and a light transit vehicle/bus were analyzed for potential service at Glen Haven.

Route Mileage and Stops

The visitor transportation vehicle would start at the parking lot south of the village, go through the village, proceed northwest to the lifesaving station, and return to the parking lot south of the village along the same route. This round-trip would be 2 miles long with stops at approximately four points for loading and unloading. For forecasting total travel and running time, it was estimated that the transit vehicle would load and unload at the parking lot/staging area south of the village, stop at the store, stop at a point west of the village for those destined for the beach, and load/unload at the lifesaving station. Based on these presumptions, total stop time would amount to approximately eight to nine minutes, and running time would amount to about 11 minutes for a total trip time of 20 minutes. The average traveling or running speed would amount to 11 miles per hour.

It would be desirable to maintain passenger schedules every 10 minutes to encourage use through convenience and flexibility. One vehicle could make three trips per hour with 10-minute headways. It would take two vehicles moving at all times to provide 10-minute headways or six trips per hour. The system could start operating at 9:00 or 9:30 am and end service around 5:00 to 5:30 pm. This schedule would depend on visitor patterns at Glen Haven. For forecasting purposes, the system was estimated to be in operation eight hours per day.

Table A-3: Average and High-Use Day Passenger Estimates
Less Than Maximum Loads

Month	Use as a Percent of August	Avg. Day Loadings 1985 ¹	High-Use Day Loadings 1985 ²	Avg. Day Loadings 1995 ¹	High-Use Day Loadings 1995 ²	Avg. Day Loadings 2005 ¹	High-Use Day Loadings 2005 ²
June	34	205	235	250	290	365	420
July	96	575	660	700	805	1,035	1,190
August	100	600	690	730	840	1,080	1,240
September	32	190	220	235	270	345	390

¹ 60 percent of visitation forecasts

² 1.15 x average day use

When passenger demand exceeded the capacity of scheduled vehicle trips, additional vehicles could be added at a scheduled departure time or in between departures to shorten headways (i.e., one bus every five minutes, etc.) This factor was included in the forecast analysis.

Capital and Operating Costs

As indicated previously, two types of vehicles were used in the forecast analysis. The costs for each of the types of vehicles were estimated as follows.

Tram System

One-power unit - \$55,000 capital costs - \$9,421 annualized capital costs (vehicle life 10 years, 12% interest rate, 10% salvage value). \$1.45 per mile operating costs.

One-power unit and one trailing coach - \$79,800 capital costs - \$13,669 annualized capital costs (vehicle life 10 years, 12% interest rate, 10% salvage value). \$1.65 per mile operating costs.

Bus system

25-Passenger Bus: \$49,000 capital costs - \$8,393 annualized capital costs (vehicle life 10 years, 12% interest rate, 10% salvage value). \$1.10 per mile operating costs.

The capital costs and annualized capital costs do not include costs for ancillary support facilities such as parking/staging areas, bus shelters (if desired), and comfort stations.

Driver's wages were estimated at \$11.25 per hour, including fringe benefits. Costs were estimated for total hours but did not include costs for overtime wages if required.

Total annualized costs included capital and operating costs of equipment (not replacement costs), personnel costs, and 20 percent added to operating and maintenance costs. This latter item included costs for overhead and/or profit, administration, and contingencies.

Annualized Cost Implications

These data, presumptions, and forecasts were analyzed to arrive at comparative potential vehicle loadings and costs. Table A-4 shows the results of these analyses. The table shows the number of passengers, number of trips, miles traveled, vehicle operator time, number of vehicles required for both average and high-use days, total annualized costs, and costs per

Table A-4: Annual Passenger Loadings and Costs

<u>Vehicle Type/Loading</u>	<u>No. of Passengers</u>	<u>No. of Trips</u>	<u>No. of Miles</u>	<u>Operation Time (hours)</u>	<u>No. of Vehicles Average Day</u>	<u>No. of Vehicles High Use Day</u>	<u>Total Annualized Costs</u>	<u>Cost Per User</u>
1985								
Max. Load - 21 Passenger Vehicle	60,450	3,720	7,440	2,116	2	3	\$ 79,196	\$1.31
1985								
Max. Load - 49 Passenger Vehicle	60,450	3,645	7,290	1,620	2	2	\$ 77,402	\$1.28
1985								
Max. Load - 25 Passenger Vehicle	60,450	3,645	7,290	1,620	2	2	\$ 56,599	\$.94
1985								
Less than Max. Load - 25 Passenger Vehicle	40,260	3,645	7,290	1,620	2	2	\$ 56,599	\$1.41
1985								
Less than Max. Load - 25 Passenger Vehicle - reduced headways in June/Sept. ¹	40,260	3,227	6,554	1,468	2	2	\$ 53,648	\$1.33
1995								
Max. Load - 49 Passenger Vehicle	73,830	3,645	7,290	1,620	2	2	\$ 77,402	\$1.05
1995								
Max. Load - 25 Passenger Vehicle	78,830	3,748	7,496	2,116	2	3	\$ 72,033	\$.98

Table A-4 (Cont.)

<u>Vehicle Type/Loading</u>	<u>No. of Passengers</u>	<u>No. of Trips</u>	<u>No. of Miles</u>	<u>Operation Time (Hours)</u>	<u>No. of Vehicles Average Day</u>	<u>No. of Vehicles High Use Day</u>	<u>Total Annualized Costs</u>	<u>Cost Per User</u>
1995								
Less than Max. Load - 25 Passenger Bus	49,020	3,645	7,290	1,620	2	2	\$ 56,599	\$1.15
1995								
Less than Max. Load - 25 Passenger Bus Reduced Headways in June and Sept. ¹	49,020	3,227	6,554	1,468	2	2	\$ 53,648	\$1.09
2005								
Max Load - 49 Passenger Bus	108,600	3,645	7,290	1,620	2	2	\$ 77,402	\$.71
2005								
Max Load - 25 Passenger Bus	108,600	4,982	9,964	2,610	3	4	\$ 90,352	\$.83

¹ 20-minute headways in June and September - 10-minute headways in July and August

user for each option. The number of additional buses and trips per high-use day was added to the costs where applicable. In each option, one standby vehicle was included in the costs emergency repairs.

The maximum load options presume that 90 percent of the private vehicular drivers and passengers would use the visitor transportation system. For all practical purposes this level of use would not be attained, particularly if a user fee was charged for ridership. Less than maximum load options presume that 60 percent of the visitors would use the visitor transportation system.

All headways or schedules between buses amounted to 10 minutes, except as noted in the table. Twenty-minute headways were used in several of the options. Because of 10-minute headway requirements, two vehicles were needed at all times because each trip is estimated to take 20 minutes for a round-trip. Consequently, all options included three units (two for use - one for standby) or more. As mentioned earlier, the 21-passenger vehicle is a tram power unit and one trailer, and the 25-passenger vehicle is a 25-passenger light transit vehicle/bus.

As noted in table A-4, the highest passenger loadings result in lower costs per rider. The lowest cost per user amounted to \$.71 using the maximum passenger loadings projected for 2005 ranging to \$1.41 for less than the maximum loads for 1985. Generally, the tram system results in higher costs due to higher capital and operating costs until higher passenger loads would require a trailer unit or units with the power unit. A large difference in annualized costs is reflected between the 21-passenger tram power unit and the 25-passenger bus, using the 1985 maximum passenger load option. Not only is the initial investment and operating costs of the tram unit higher but one more power unit would have to be added because the 21-passenger capacity of two power units would not meet the high-use day loadings.

As noted in the 1985 and 1995 loading options, reducing the headways in June and September would result in some cost savings. Passenger loadings would be much less in these two months than in July and August. However, flexibility and convenience in ridership would be decreased with longer headways.

The use of a tram with the 2005 projected loads would result in lower costs due to the flexibility in carrying a higher number of passengers per trip. A second and third trailer can be added to the power units to additionally increase capacity per trip if demand would warrant higher loadings.

Presuming that the user would have to pay the costs of operating a system and that passenger loadings would be near 50,000 per season (60 percent of present visitation or 72 to 73 percent of projected 1995 visitation), the cost per user is estimated at approximately \$1.15 (1995 less than maximum load - 25-passenger bus option). The costs per user probably should be spread among children and adults. Presuming that one of four riders is 12 years old or younger and that user fees would be lower for children, a fee schedule might be arrived at as follows:

Presume	49,000 passengers
	\$56,599 annual costs
	Average cost per user = \$1.15 for one round trip

Charge \$.50 for children (\$.50 x 25 x 49,020) = \$6,128 to be paid for children
\$56,599 - \$6,128 = \$50,471 to be paid by adult riders
\$50,471 ÷ 36,765 (adult riders) = \$1.37 (round to \$1.40)

If the user had to totally pay for the trip, adult ticket prices would be \$1.40 per person, and children's ticket prices would be \$.50. The costs could be higher with lower ridership levels and/or if specific support facilities were added to the user costs (i.e., parking/staging area, shelters, comfort stations). Replacement of new vehicles at the end of the service life of existing vehicles (10 years) was not included at a future year at higher capital costs. Amortization of costs of first-purchase of new vehicles was included. Overtime wages for drivers were not included, but all operating hours of drivers were included.

Based on the operational aspects of the system projected in this report, it appears that the cost per user would be over \$1.00 per person and probably closer to \$1.50 per person if a fee system were used to pay for the total system.

It appears that \$1.50 per rider might be an excessive fee for the total experience gained by the visitor in the Glen Haven Area and might discourage use of the area when the shuttle was in operation. Glen Haven Village would be in close proximity to the parking/staging area and visible from the parking area. A user fee would encourage visitors to walk to the village rather than take the shuttle. Consequently ridership levels would be lower and the cost per user higher.

Costs might be saved if used vehicles were utilized or if a system currently operating with the county could be expanded/used in the Glen Haven Area. An example of how an outside system has been successful is at Rocky Mountain National Park. The park leases school buses from the school district during the summer.

Costs also could be higher than projected because of the greatly increasing insurance rates for liability. Also, if an operator had to purchase new vehicles for use only 81 days per year, and they were unused the remainder of year, the profit potential would be low on an annual basis.

Parking/Staging Area Needs

If visitor parking is south of the village, during shuttle operation hours, the total parking time would consist of time spent at the village, beach, Coast Guard station, and the Dune trailhead plus the time riding on the shuttle. Parking needs for the years 1985, 1995, and 2005 are shown in table A-5. The numbers are based on the high-use day maximum passenger loadings for parking a duration of 2 hours, 2 hours/30 minutes, and 3 hours/20 minutes for a round trip on the shuttle.

Table A-5: High-Use Day Parking Needs, Village Parking Lot with Shuttle Service Maximum Loads

<u>Year</u>	<u>No. of Visitors Projected to Ride Shuttle</u>	<u>No. of Visitors per Hour¹</u>	<u>No. of Vehicles per Hour²</u>	<u>Parking Demand 2 hrs 20 mins</u>	<u>Parking Demand 2 hrs 30 mins</u>	<u>Parking Demand 3 hrs 20 mins</u>
1985	1035	135	41	96	116	135
1995	1265	165	50	117	142	165
2005	1865	250	78	182	221	257

¹ $\frac{1035}{8} = 129$ (used 135) $\frac{1265}{8} = 158$ (used 165) = 233 (used 250); used

slightly higher figures for the higher use hours during the day;
parking would not be evenly spaced over an 8-hour day.

² No. of visitors 3.3

Note: In using the less-than-maximum loads forecasts, the parking demands would be approximately 66 percent of the demands in this table.

The use of a central parking/staging area would require one single lot larger in size than individual lots serving each of the use areas in Glen Haven.

Using a parking duration figure of three hours and the maximum load option range, parking demand would range from 135 to 257 spaces, depending on passenger loading. If the less-than-maximum loads forecast for 1995 (49,000 passengers) is used as in the example for estimating adult and children's fares, a central parking/staging area of 110 spaces (.66 x 165) would be required for transit riders. However, some spaces would be required for visitors not riding the system. Under this option, the parking/staging area would probably require spaces for 130 to 140 vehicles.

A parking area containing 257 spaces would require 3.0 to 4.0 acres, depending on landscaping and the percentage of oversized spaces.

Visitor transportation system vehicles would require space to be stored near the Glen Haven area. Routine maintenance and repair space would also be required near the area.

Conclusions

It was difficult to forecast visitation and potential passenger loadings for the Glen Haven area due to the limited amount of visitor use data for the total area (Glen Haven Village, beach, Coast Guard station, and dune trail area near the station) and the undeveloped nature of the village at this time.

If user fees were charged for riding the system, visitors might choose to walk to the village from a nearby parking/staging area because of the short walking distance of less than 1/2 mile one-way. The transit trip is not one of going from the parking/staging area to one destination point but rather to dispersed points along the route. A free-use system would attract more ridership even for the short segments of the trip.

Total annualized costs to operate the system would range from \$53,648 to \$90,352, and the cost per user would range from \$.71 to \$1.41, using new vehicles. With a passenger loading of near 50,000 per season, a fee structure of \$1.50 for adults and \$.50 for children is estimated to cover system costs. If ridership was lower, costs per rider would be higher. Used equipment or equipment leased through a local transit company or school district might cost less; however, in this instance the vehicles might not meet the operational needs of the Park Service.

Because of greatly increasing insurance rates for liability, the uncertainties concerning ridership levels, the dispersed nature of visitor destinations in the area, and the present lack of visitor activities in the village, it appears that a visitor transportation system is neither economically feasible nor will it be for perhaps up to 10 years. In the long term, 15 to 20 years, with full adaptive use of the village, ridership levels might be at a level to sustain the system if it had to cover costs. If the

Draft Development Concept Plan were implemented, the proposed village bypass and parking areas would still be used by private vehicles during the season when the transit system is not in operation. A new staging/parking area would be required at the south edge of the village. The proposed DCP would not preclude this action.

A single parking/staging area at the south edge of the village would require a higher number of parking spaces than the total for the dispersed lots because all visitor duration/stay time would be concentrated at one location rather than three or four lots, and parking time must include the time for riding.

Appendix B: GLEN HAVEN DEVELOPMENT CONCEPT PLAN - OPERATIONS IMPACT ASSESSMENT

	Alternative 1 No Action			Proposal			Alternative 2			Alternative 3		
	<u>FTE</u>	<u>Grade</u>	<u>Amount</u>	<u>FTE</u>	<u>Grade</u>	<u>Amount</u>	<u>FTE</u>	<u>Grade</u>	<u>Amount</u>	<u>FTE</u>	<u>Grade</u>	<u>Amount</u>
Visitor & Resource Protection	No Change			.5	GS-5	8,500	.5	GS-5	8,500	.6	GS-5	10,200
				Supplies and materials		850	Supplies and materials		850	Supplies and materials		1,020
Maintenance	.2	WG-3	4,575	.4	WG-3	9,150	.2	WG-3	4,575	.4	WG-3	9,150
	.3	WG-5	6,750	.7	WG-5	15,750	.5	WG-5	11,250	.7	WG-5	15,750
	.1	WG-8	3,040	.1	WG-8	3,040	.5	WG-7	13,045	.3	WG-8	9,120
							.5	WG-8	15,200			
				Supplies, materials, and utilities		11,000	Supplies, materials, and utilities		26,000	Supplies, materials, and utilities		17,000
Interpretation	No Change			Supplies and materials		4,600	Supplies and materials		13,800	Supplies and materials		4,000
Administration and Management	.1	GS-6		.1	GS-6	1,848	.1	GS-6	1,848	.1	GS-6	1,848
				.1	GS-11	3,136	.1	GS-11	3,136	.1	GS-11	3,136
Totals			\$23,313			\$64,674			\$111,804			\$78,024

Note: Salaries include 12.4 percent for personal benefits. FTE and supplies, materials, and utility costs reflect additional expenditures required above and beyond existing funded levels.

IMPACTS ON PARK OPERATIONS

No-Action Alternative

Visitor protection and interpretation would continue with no change in basic costs to operations outside of adjustments made for inflation and increases or decreases in visitor use. Maintenance costs would continue to rise as each reservation or use and occupancy agreement expires. The level of preservation would be limited to exterior preservation only and costs shown would reflect the anticipated increase in maintenance for the area once all the leases expired.

The Proposal

Visitor protection requirements would be similar for the proposal and alternatives 2 and 3, as all are mostly identical in expansion of visitor facilities (campground, parking lots, picnic areas), which would need adequate patrols to provide for resource protection, crowd control, law enforcement, and information contact. An additional seasonal ranger would be required to provide for adequate patrols.

Maintenance expenditures would increase as shown because of expanded visitor facilities in the village (restrooms, exhibit space, the bypass road, parking lots, and the expanded and upgraded campground). Increased costs in support reflect utility, supplies, materials, and cyclic costs.

Interpretation staffing costs would be only minimally affected by adding a seasonal interpreter for guided tours in the village, museum, trails, and campground.

Alternative 2

Visitor protection costs would follow the logic of the proposal.

Maintenance expenditures in the campground would be less than the proposal because there would be no upgrading, only expansion. However, the costs associated with maintaining the structures in the village would increase because the historic leasing program would not be as comprehensive as the proposal's.

Interpretation costs would increase because there would be more village structures devoted to interpreting the village story.

Alternative 3

Visitor protection would increase slightly because of the expanded bypass.

Maintenance costs would be similar to the proposal; however, an increase would be required to maintain the expanded road system.

Interpretation would decrease slightly because there would be less opportunity to provide brochures.

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